FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1931

Feb. 27 "Aircraft Light Alloys." Lecture, by H. Sutton, before R.Ae.S., Hull.
Feb. 27 British Gliding Association Annual General Meeting.
Mar. 4 .. "Meteorology and Air Navigation," R.U.S.I. Lecture, by Lt.-Comdr. J. W. Josselyn. 3 p.m.
Mar. 5 "Mechanical Testing of Aircraft Materials." Lecture, by L. W. Nethercott, before R.Ae.S. (Glos. and Chelt.)
Mar. 7 Sailplane Club and Model Aircraft Club Joint Dance at Suffolk Galleries
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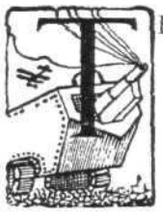
May 14 "Metal-Clad Airship," Lecture, by C. Fritsche, before R.Ae.S.

EDITORIAL COMMENT



THE whole country was shocked when the "Iris" of No. 209 (Flying Boat) Squadron crashed into Batten Bay, on February 4, with twelve on board, and killed six of them. The record of flying boats in the Royal Air Force has been so good for so many years past, that it was generally felt that something very unusual must have happened. There are some branches of flying in which, sad to say, we have come to expect a certain number of casualties each year. Perhaps there is something wrong with those branches.

The "Iris" Inquest

We should like to think that all flying was a reasonably safe occupation in time of peace. But pilots themselves accept crashes in much the same way as cavalry officers regard a toss in the hunting field. We have come to accept the point of view that fighter pilots, for example, must be very daring men, or they would not be any good as fighter pilots; and certainly the line between daring and rashness is a very fine one. Rashness in an aeroplane is commonly paid for much more dearly than rashness in the hunting field, and so a number of Royal Air Force casualties is accepted as the price which we pay for what security in the air we may possess. We should very much like to think that the price paid is unnecessarily high; but if that is so, it means that there is room for improvement in the methods of the Royal Air Force. When, last summer, a "Bulldog" collided with a "Horsley" in a practice fight, a horrified civilian who happened to be in the vicinity that day, asked an Air Force officer whether anyone would be court martialled, as is always done in the case of a naval officer who does not prevent his ship from colliding with another. The reply was that there would probably be no court martial, as the officer in question did not mean to cause a collision. However, in a more recent case of a collision between two "Siskins," the surviving officer was court martialled and was acquitted. This procedure shows an improvement in practice in the Royal Air Force.

But, when we turn from fighter squadrons to flying-boat squadrons, we change our atmosphere.

IN PARLIAMENT

Flying-Boat Accident at Plymouth

MR. MONTAGUE, on February 9, in reply to Mr. Hore-Belisha, said: A Court of inquiry is now being assembled in respect of the disaster to the flying boat "Iris" at Plymouth, and I am not therefore, in a position to add anything to the information which has already been published. I am sure the House would wish me to take this opportunity of conveying publicly an expression of its deepest sympathy to the relatives of those who lost their lives in this most regrettable accident to one of our largest flying boats.

Airship Works, Cardington Discharges

MR. MONTAGUE, on February 11, in reply to Mr. Wells, said the number of industrial employés dismissed from the Royal Airship Works at Cardington since the R. 101 disaster is 323 (222 men and 101 women); of these, 66 men were given notice prior to the disaster, and their dismissal was not a consequence of the loss of R. 101. The number at present employed at the Royal Airship Works is 385 (292 men and 93 women).

Personnel Wastage

MR. MONTAGUE, in reply to Mr. Ayles, said the figures of the annual wastage of airmen in the Royal Air Force and the percentage they bear to the total strength for the years below are as follows:—

Year.	Wastage.	Percentage of Total Strength.
1926	3,307	11·16
1927	4,511	16·87
1928	2,187	8·06
1929	2,507	9·04
1930	2,153	7·54

Meopham Flying Disaster

MR. MONTAGUE, on February 12, in reply to Capt. H. Balfour, said: The Secretary of State for Air has accepted the finding of the Sub-Committee of the Aeronautical Research Committee which investigated the accident to the Walcot air liner G-AAZK at Meopham, on July 21, 1930, which finding was approved by the Aeronautical Research Committee itself; and in all the circumstances he does not consider that any useful purpose would now be served by a public inquiry. The further investigations into the phenomenon of buffeting, which were recommended by the committee, are in progress at the National Physical Laboratory; and similar investigations are being carried out in Germany. Close touch is being kept with the German authorities on this point. Pending the result of these investigations, my noble friend has reserved his decision with reference to the continued validation of the certificates of airworthiness for the three aircraft of this type now in this country; but copies of the report of the Aeronautical Research Committee have been sent to the owners of these aircraft, and their attention has been specially drawn to the circumstances of the accident and to the Committee's finding as to its cause. I understand that the machines are not being used. The suggestion that a public inquiry was promised is not accepted by the Minister as a correct statement of fact.

MODELS

THE MODEL AIRCRAFT CLUB. (T.M.A.C.)

Competition Rules.—All members are specially requested to keep a copy of the following competition rules which have been adopted in preference to other formulæ at present existing. The development of the club would be in accordance with the practice of the present-day aviation industry.

Before any competition is flown, all entrants will submit their models for examination by the stewards of the day, in order that points to the maximum value of 100 can be awarded in the following manner.

1. Design and construction (originality, progress, and workmanship); maximum award, 25 points.
2. Power (other than elastic); maximum award, 25 points.
3. Ability to R.O.G. (from suitable ground); maximum award, 25 points.
4. General stability (quality of flight, and gliding at the termination of flight); maximum award, 25 points.

During the competition flights, one extra point will be awarded for each second that the model is in the air unless conditions of the contest renders this impracticable, when extra points will be awarded as arranged by the particular contest in question.

Inauguration of 1st Wing, T.M.A.C.

ON Sunday, February 15, the inauguration meeting took place of 1st Wing, comprising Squadrons 1, 2 and 3. There are now four Wings organised in the London Area.

Owing to unforeseen circumstances, it was found necessary to hold the meeting at Parliament Hill, but in future 1st Wing should be operating from their own ground—Hampstead Heath Extension. Apologies are due to those visitors who were inconvenienced by the change of ground—their attendance at Parliament Hill was greatly appreciated.

The Organising Secretary, Mr. Yeomans, in presenting the Certificate of Inauguration to the Wing Commander, Mr. W. R. Burnett (Chairman T.M.A.C.), referred to the pleasures in store when Inter-Wing Contests can be held, and Mr. Burnett promised that his section would be "all out" to excel in these affairs.

A good flying display then took place. Various high and low wings, cabin planes, midgets and Gliders taking part. The buoyant air enabled some fine high flights to be accomplished. Models were flown by 1st Wing members, potential 2nd Wing members, who use Parliament Hill each Sunday, and a strong contingent of 4th Wing from Hackney Marsh.

Hon. Secretary, A. E. Jones, 48, Narcissus Road, West Hampstead, N.W.6.

IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1930 being given in FLIGHT, January 16, 1931.

	Imports.		Exports.		Re-exports.	
	1930.	1931.	1930.	1931.	1930.	1931.
	£	£	£	£	£	£
Jan.	2,987	7,965	147,935	142,596	—	1,074

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: No. 1315 (*Ae.* 470).—An Experimental Determination of the Intensity of Friction on the Surface of an Aerofoil. By A. Fage and V. M. Falkner. April, 1930. Price 1*s.* 3*d.* net. *No.* 1337 (*Ae.* 468).—The Stresses in a Radially-Spoked Wire Wheel Under Loads Applied to the Rim. Part II. Simplified Formulæ and Curves. By Prof. A. J. Sutton Pippard and W. E. Francis. July, 1930. Price 9*d.* net. *No.* 1338 (*Ae.* 469).—Stalled Flight Tests on a Bristol Fighter Fitted with Auto Control Slots and Interceptors. By R. P. Alston and Pilots of Aerodynamics Flight, R.A.E. June, 1930. Price 4*d.* net. *No.* 1339 (*Ae.* 471).—Full-Scale Experiments on High Tip Speed Airscrews; The Effect of Thickness of Section on Airscrew Performance. By W. G. Jennings and A. Ormerod. August, 1930. Price 6*d.* net. *No.* 1340 (*Ae.* 472).—Directional Stability of High-Speed Aircraft. By W. G. Jennings. May, 1930. Price 6*d.* net. H.M. Stationery Office, Kingsway, London, W.C.2.

Technical Report by the Accidents Investigation Sub-Committee on the Accident to the Aeroplane G-AAZK at Meopham, Kent, on July 21, 1930. *Aeronautical Research Committee Reports and Memoranda No.* 1360. *January,* 1931. H.M. Stationery Office, Kingsway, London, W.C.2. Price 5*s.* 6*d.* net.

Who's Who in British Aviation, 1931. Airways Publications, Ltd., 6, Norfolk Street, Strand, W.C.2. Price 6*s.* net.

NEW COMPANIES REGISTERED

AIRSCREW COMPANY, LTD.—Capital, £15,000, in £1 shares.—Objects: Manufacturers of aircraft propellers, aircraft of all kinds, aircraft engines and parts, and components thereof, etc. Solicitors: Reynolds Sons and Gorst, 7, Arundel Street, W.C.2.

IONA NATIONAL AIRWAYS, LTD. (8,085).—Capital, £2,500, in £1 shares.—Manufacturers and repairers of and dealers in balloons, aeroplanes, hydroplanes and airships of all kinds, etc. First directors: H. Cahill, Prospect Villa, Glasnevin, Dublin. Mrs. Caroline Cahill, Prospect Villa, Glasnevin, Dublin.

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1929

Published February 19, 1931

31,604. C. TÖPFER and F. TÖLKE. Aeroplane wings. (341,853.)

APPLIED FOR IN 1930

Published February 19, 1931

1,986. SCHLEPPSCHRIFT-UDET GES. Displaying targets for anti-aircraft gun practice by means of aircraft. (342,116.)

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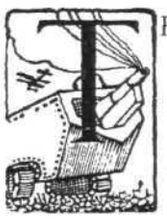

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The "Iris" Inquest

But, when we turn from fighter squadrons to flying-boat squadrons, we change our atmosphere.

We do not expect crashes, for normally they do not occur. This long immunity made the disaster to the "Iris" all the more shocking. Our horror is increased by the revelations at the inquest, which showed how very unnecessary the crash had been. It could, in all probability, have been avoided by ordinary sound piloting. The first pilot of the boat gave evidence, in hospital, that he felt convinced that he could have landed the boat safely if he had been in full control.

The fact is, that a situation was permitted to arise which was fraught with possibilities of disaster. A Wing Commander who was in command of a squadron was also a pupil under the instruction of one of his junior officers, a Flight Lieutenant. The Wing Commander had, for most of his service, been a technical officer, but he had been a qualified pilot of landplanes for the past 10 years. He had not qualified as a first pilot of flying boats. It makes a very delicate position when a senior officer has to be put under instruction by one of his own junior officers. Still, it is a position not without precedent in the British services. Army officers are taught to drill and to ride by non-commissioned officers, and friction is very rarely a result. We might almost say that it is unknown.

This flight, however, was not an instructional flight. It was a flight for firing practice. Still, Wing Commander Tucker, though he was actually in command of the squadron, had been told definitely by the officer commanding the station that he must abide by the directions and instructions of the first pilot until he had qualified as a first pilot himself. It was also stated in evidence that it would have been possible for Squadron Leader Jones, also of the same squadron, but also junior to Wing Commander Tucker, to have told the latter that he must not do any piloting on that flight. This, it seems, would have been a rather difficult order for a Squadron Leader to give to a Wing Commander, especially when the latter was actually commanding the squadron.

The real trouble seems to have arisen through the first pilot of the boat not having realised how completely he had been put in command over the head of his own C.O. The first pilot said in his evidence (we are accepting the report in *The Times*) that the Wing Commander was his senior officer, that he was in his hands and had to obey his ruling, and that he did not think that he had the right to insist on taking over control. He was admittedly in a very difficult position, and everyone will sympathise with his difficulties.

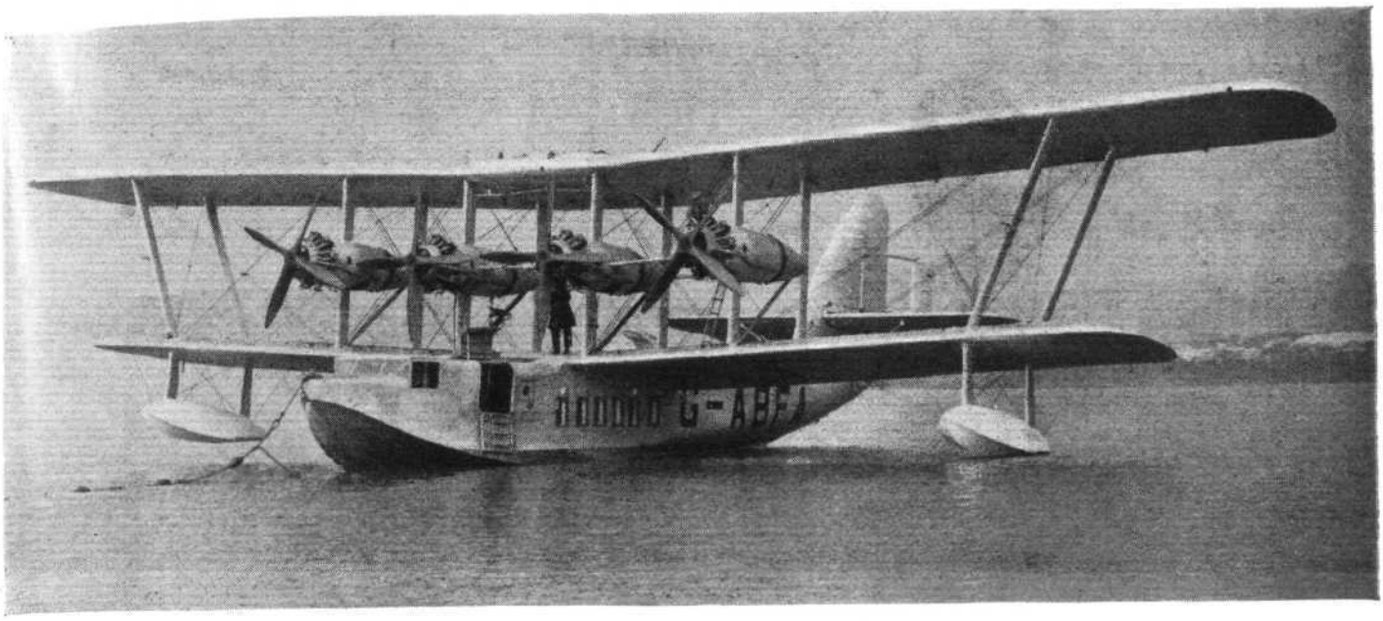
In considering this very deplorable case, we should not forget that cases may be found in history where a senior officer who was temporarily under the command of a junior officer has had to assert his authority to prevent disaster. There was a notable case in the first Sikh war. The Governor-General, Lord Hardinge, volunteered to serve as a subordinate military commander under the Commander-in-Chief, General Gough. Gough announced that he would attack the Sikh army without waiting for some expected reinforcements. Hardinge realised the folly of this course, and asserted his authority as Governor-General to over-ride the Commander-in-Chief on a military point. Almost certain disaster was thus averted. These circumstances were exceptional, and Hardinge was an exceptional man. The precedent which he set was dangerous, though his individual action was amply justified by the result. The example must not be copied by every senior who is temporarily under the direction of a junior. The only safe course is for the former to forget all about his seniority for the time being.

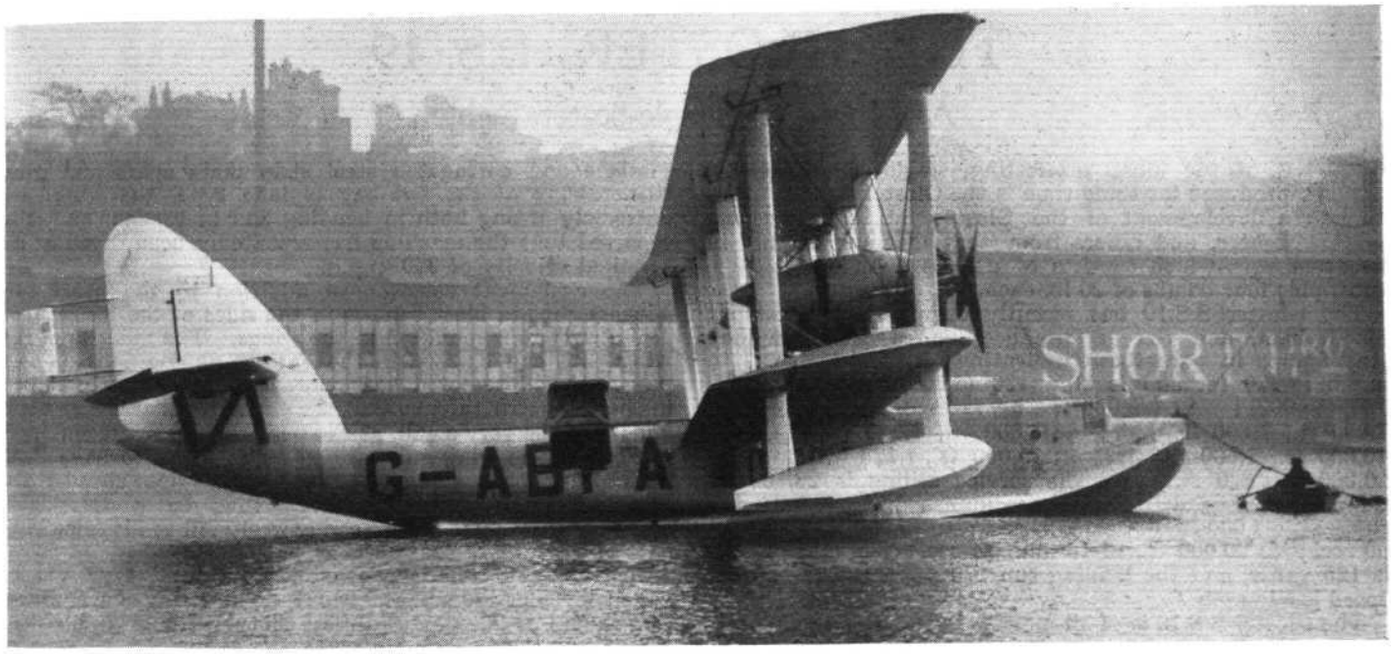
We may find a sound precedent in another direction. A patient in a Military or Air Force hospital must, in all medical and surgical matters, obey the orders of the responsible medical officer. An Air Vice-Marshal who is a patient must obey a medical Flying Officer. This case seems very much on all fours with the case of a senior officer who is under flying instruction. In fact, there can be no doubt that in this case the Wing Commander ought to have felt himself bound to obey and submit to the first pilot in all matters concerning the flying of the boat.

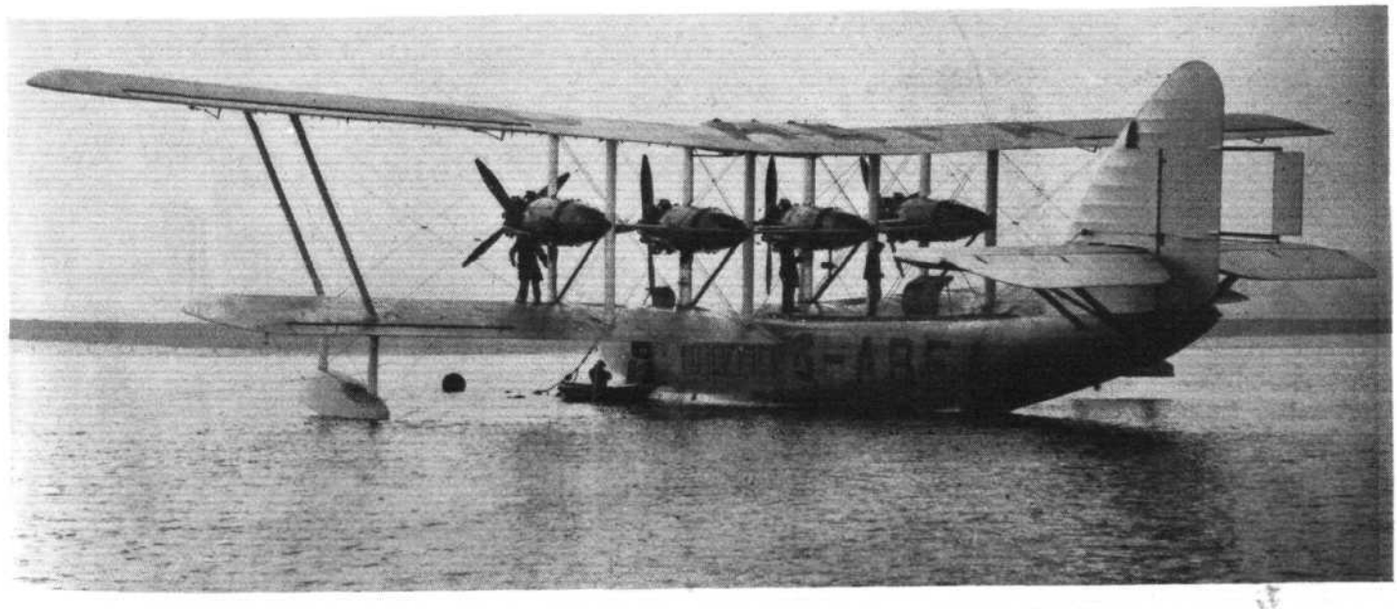
It is easy to be wise after the event. The fact is, that a situation which is always delicate, but which is a common practice in the British services, was aggravated by posting a Wing Commander to command a squadron before he had learnt to fly the particular type of aircraft with which that squadron was equipped. For this arrangement, no one at Mount Batten was responsible. It was arranged by higher authority. The jury, at the inquest, was quite right in recommending that this should not occur again. It would be absurd to say that a senior officer should never receive instruction from a junior. But during the period of instruction the junior must, clearly and unmistakably, be invested with superior authority. A Flight Lieutenant giving instruction to a Wing Commander will not, of course, address him in the terms which a sergeant-major may use to a recruit. He will call him "Sir," and treat him with respect. But his instructions will be the orders of some authority far senior to that of a Wing Commander. The instructor must speak with the voice of the Air Council, or even with that of His Majesty the King. In this case, the Wing Commander had been told by his superior, the officer commanding Mount Batten station, that he must, for flying purposes, put himself under the directions of his instructor, and he did not do so. The fact that they belonged to the same squadron made the position of the instructor more difficult than it need have been, and should have been, and it appears from his evidence that he did not realise the authority which he undoubtedly possessed of over-riding the wishes of the commanding officer of the squadron. The whole affair was a tragic fiasco. Fortunately, it is the first tragedy of its kind, and it remains for the Air Council to see that it shall be the last.

To the relatives of the victims we offer our deepest sympathy, and we should also like to offer sympathy to the Commanding Officer and station of Mount Batten for being concerned in a tragedy for which they were in no way responsible.

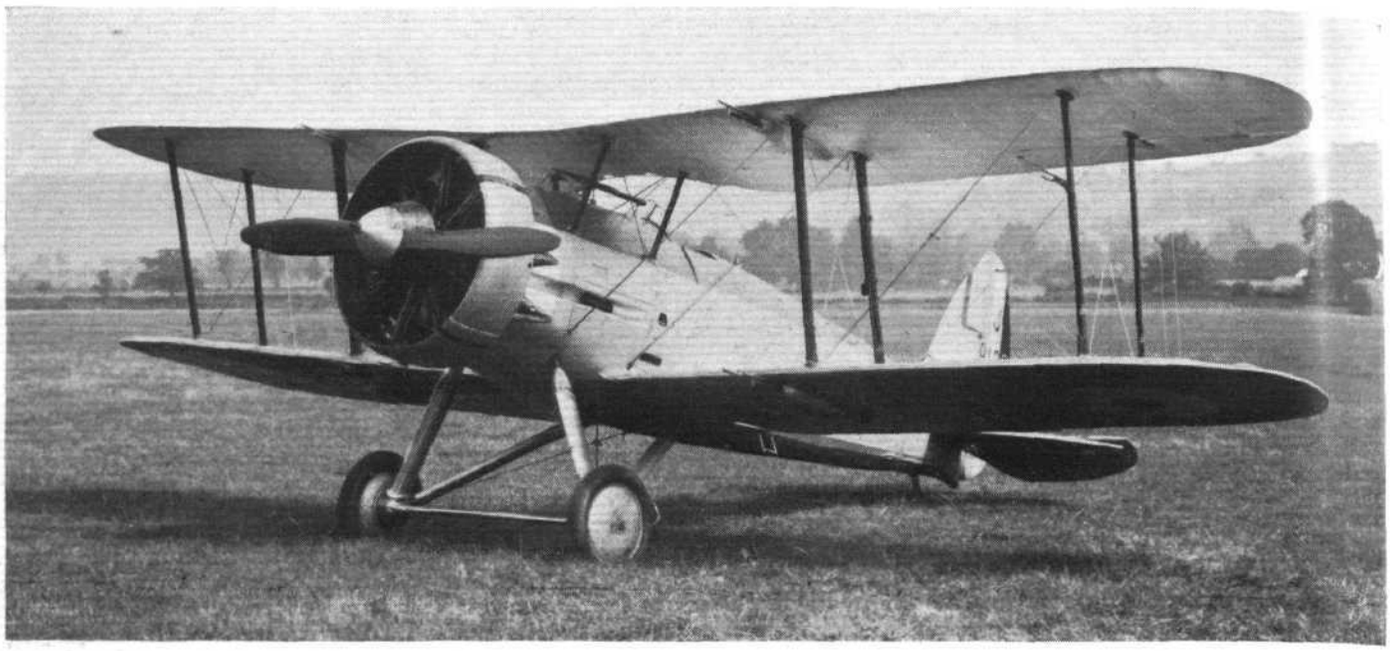
FOR EMPIRE SERVICE







A WONDERFUL NEW FLYING BOAT: The first of the Short "Kent" class, to be named "Scipio," was launched at Rochester on February 24, and made a perfectly successful test flight, piloted by Mr. Lankester Parker. The machine, which is equipped with four Bristol geared and medium supercharged "Jupiters," is one of three ordered by Imperial Airways. (See p. 188). (FLIGHT *Photos.*)



THE GLOSTER S.S. 19

A Multi-Gun Single-Seater Fighter

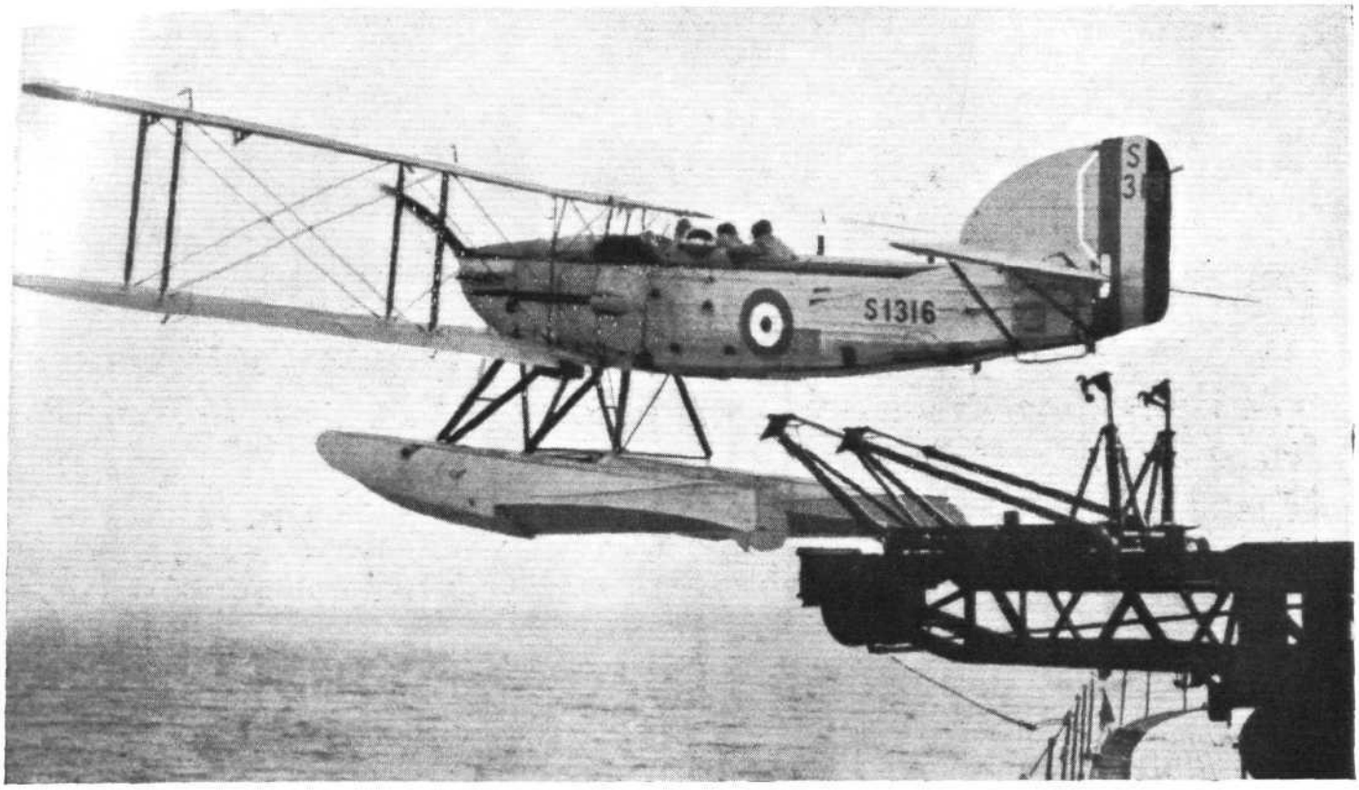
ONE of the most interesting single-seater fighters produced for some time is the Gloster S.S.19. It is a development of the Gloster S.S.18 interceptor fighter, and differs from that machine mainly in its armament, which consists of no less than six machine guns, plus four bombs of 20 lb. each.

The Gloster S.S.19 has recently completed its tests at Martlesham, and the performance figures are as follows (the figures in parentheses indicating altitude) :—Speed in m.p.h. : 170 (ground level) ; 180 (5,000) ; 188 (10,000) ; 186 (15,000) ; 176 (20,000). The rates of climb are : At 1,000 ft., 1,800 ft./min. ; at 5,000 ft., 1,720 ft./min. ; at 10,000 ft., 1,600 ft./min. ; at 15,000 ft., 1,125 ft./min. ; at 20,000 ft., 660 ft./min. The service ceiling is 26,100 ft. Climb to various altitudes are accomplished in the following times : To 5,000 ft., in 2 min. 54 sec. ; to 15,000 ft., in 9 min. 30 sec. ; to 20,000 ft., in 15 min. 14 sec. The take-off run is 125 yards, and the landing run 170 yards. The landing speed is 57 m.p.h.

The Gloster S.S.19 is of all-metal construction, incorporating the usual Gloster forms of construction, *i.e.*, steel tube fuselage and corrugated steel strip main spars and wing ribs. Being of the two-bay biplane type, the wings are extremely strong both in bending and in torsion, and it is reported that the machine has repeatedly been dived at its terminal velocity of 320 m.p.h.

The armament consists, in addition to the usual two Vickers guns in blast tunnels in the sides of the fuselage, of four Lewis guns mounted in the wings. The muzzles of the wing guns can be seen in the FLIGHT photographs on this page. It will be noted that they have been neatly housed in the wing structure, so that the extra drag caused by these guns must be very small, as the performance figures indicate it to be. The wing guns are so mounted as to have their lines of fire converging on a point some distance ahead of the machine. The machine should thus be a formidable opponent, as a burst of fire can scarcely fail to hit some vital part of the target.

The engine fitted is a Bristol "Jupiter" type VII F, which develops 480 h.p. at 9,000 ft. The fitting of a Townend ring should be noted. Doubtless this contributes in no small measure to the high performance.



CATAPULT LAUNCHING OF AIRCRAFT: This photograph of a Fairey III F seaplane being catapulted off is reproduced by courtesy of the Admiralty.

AIRCRAFT CATAPULTS

Scottish Firm Markets Two Successful Types

DUE chiefly to a policy of reticence on the part of British manufacturers, the impression appears to have got about that foreign countries have stolen a march on Great Britain in the matter of catapults for launching aircraft. The United States have been experimenting with and making use of catapults for a number of years. France also has produced catapults, and Germany, notably the Heinkel firm, has had on the market for a considerable period a catapult which was used experimentally for the launching of civil aircraft from liners. What Great Britain has been doing has not hitherto been permitted to become known. A short time ago, however, photographs were published (see FLIGHT of October 24, 1930) of a catapult with which experiments in launching had been carried out at the Royal Aircraft Establishment at Farnborough. Now it has become possible, by the courtesy of the Admiralty and of the makers, to publish more detailed particulars of a very powerful catapult manufactured by Mactaggart, Scott and Co., Ltd., of Loanhead, Edinburgh. Actually two distinct types are available—one known as the extending structure type, and the other known as the fixed type, in which the actual trolley used for supporting the aircraft is similar to that used in the extending structure type. The fixed type is intended for operating from ships in which the track rails are fixed to the deck, the actuating mechanism being housed below deck. The following notes will deal mainly with the extending structure type, in which the rails are so arranged that the line of take-off can be adjusted to any angle desired, and is not confined to the fore-and-aft line of the ship.

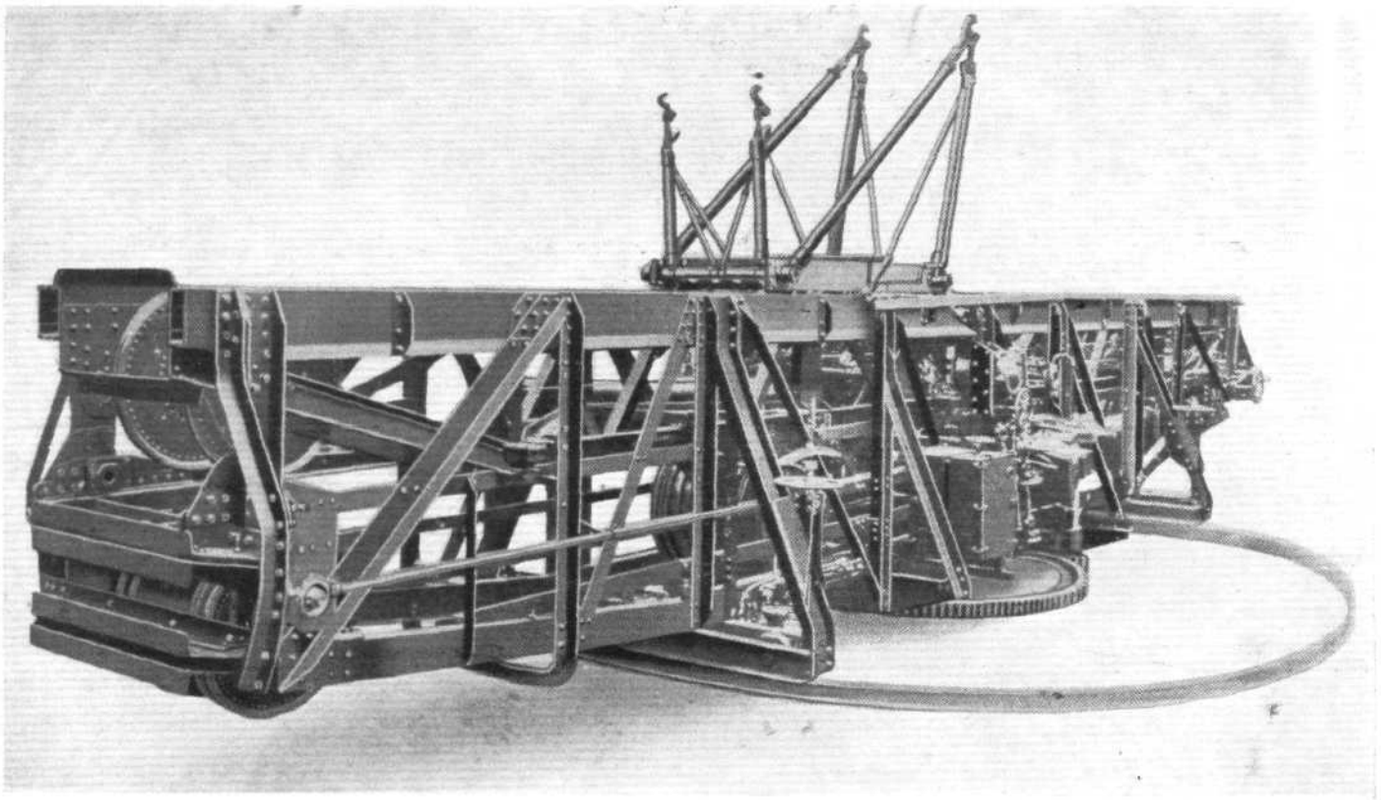
The Mactaggart, Scott and Co. extending structure type of catapult consists of four main parts: the trolley, the main extending structure, the actuating mechanism, and the operating gears. For a total weight of 19 tons, the catapult will launch any type of aircraft, landplane, float seaplane, flying boat, or amphibian. The launching speed varies according to the weight of the aircraft. Thus a machine weighing 8,000 lb. is catapulted off at a speed of 57 m.p.h. A machine weighing 7,000 lb. is launched at 60 m.p.h., while a 6,000-lb. aircraft is launched at 63 m.p.h. The length of the catapult stowed is 46 ft., and the length fully extended is 75 ft. 9 in. The total length of run for the aircraft is 64 ft., of which 50 ft. 6 in. is accelerating travel and 13 ft. 6 in. is retarding travel (the aircraft actually is released during the retarding travel). The mean acceleration obtained depends, of course, on the launching speed. In the case of the 57 m.p.h. launching speed the mean acceleration is 2·15 g. For 60 m.p.h. it is 2·38 g., and for 63 m.p.h. it is 2·62 g.

The Trolley

That part of the catapult on which the aircraft is mounted is known as the trolley, and consists of a rectangular framework of four steel channels carrying the four legs by which the aircraft is attached to the trolley. At each corner of the trolley frame are two wheels mounted on special high-duty roller bearings. The object of fitting two wheels at each corner is that, as the main frame consists of a fixed frame and two moving frames running inside the fixed frame, the wheel track varies according to whether the trolley is on the fixed frame rails or on the rails of the extending frames. When on the latter, the inner wheels support the trolley. When the trolley is over the fixed frame portion, however, it runs on its outer wheels.

At the forward end of th trolley is a pair of struts which terminate at the top in jaws or forks. These forks engage with trunnions on the aircraft. The two struts, or legs, at the rear corners of the trolley frames, similarly end in forks, which support the rear trunnions on the aircraft. Sloping from the tops of the forward struts down to the rear cross shaft are two diagonal members, which are actually telescopic struts with oleo gear incorporated.

When the aircraft is being launched, the thrust is delivered to the aircraft through the front forks. The rear forks serve to hold the aircraft at the correct angle of incidence, and to this end the rear struts of the trolley are adjustable in length. The adjustment provides for a range of incidence from 0 degrees to 12 degrees. To prevent the aircraft from being pulled out of the forks under the thrust of the airscrew while the trolley is stationary or travelling at low speed, detents are fitted which lock the trunnions to the forks. Not until the trolley has travelled a certain distance and has attained a speed at which the acceleration is greater than the



THE MACTAGGART, SCOTT & CO. CATAPULT: View of right side, looking forward. The catapult and trolley are in the "stowed" position.

airscrew thrust are these detents released (automatically), and there is thus no risk of the aircraft being pulled out of the trolley forks prematurely. The gear which releases the detents at the same time releases a locking device on the oleo legs. When the trolley reaches the end of its accelerating travel it is retarded by the actuating mechanism, and the aircraft then flies off as soon as the airscrew thrust begins to work (the thrust is, of course, small during acceleration). As soon as the weight of the aircraft is taken off the forks, the four legs fall down in order not to foul any part of the aircraft. The four tubes which support the aircraft are, by the way, adjustable sideways, while the rear legs are also adjustable fore and aft. Thus, aircraft of various sizes and with different distances between their four trunnions can be launched from the same trolley.

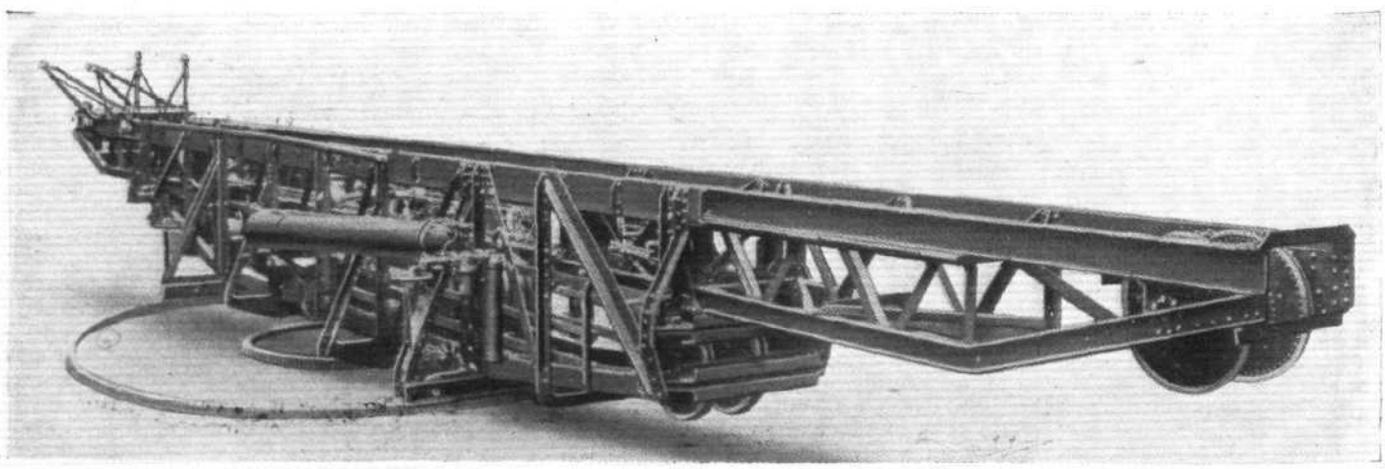
The Structure

As already mentioned briefly, the main structure of the catapult consists of three parts: the main central structure, the forward extending portion, and the rearward extending portion. The whole structure is built up of high tensile steel sections. The central fixed frame is braced outwardly, while the two extending portions are braced internally, so as to provide clearance for the extending portions to travel inside the fixed frame. To facilitate transport, the main central frame is divided in its centre, so that it can be taken to the site or ship in two halves. There it is erected and bolted together. The two extending frames are similar, and each is half the length of the fixed central frame, so that when the catapult is in the "stowed" position, the extending frames are entirely housed within the fixed frame.

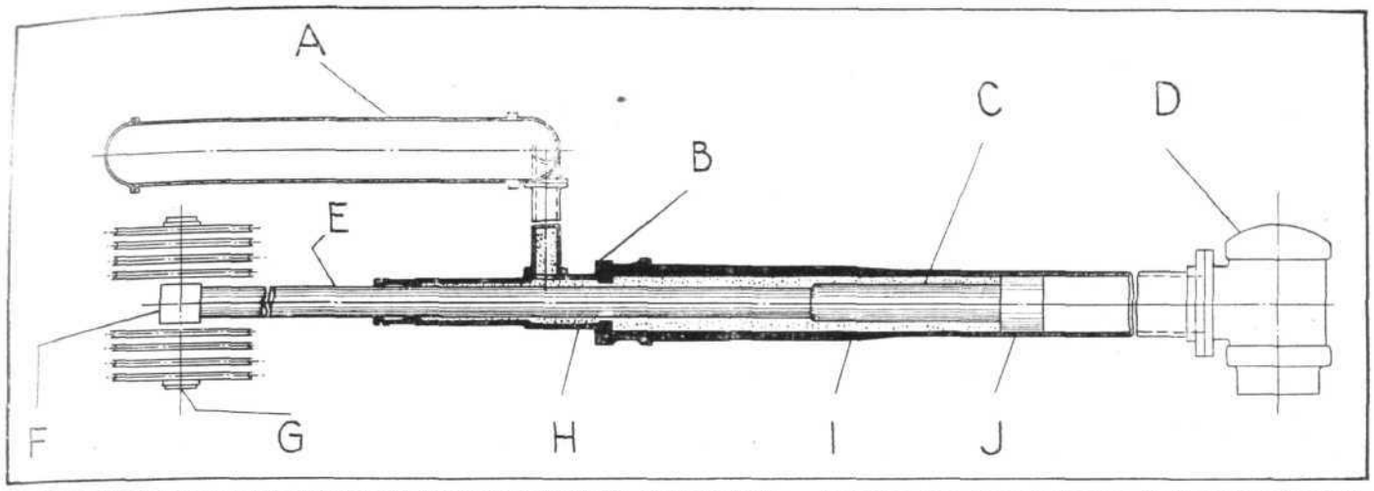
The Actuating Mechanism

The mechanism which transmits the power for catapulting to the trolley is a piston or ram working in a power cylinder. The ram does not, however, work direct on the trolley. It is connected to the trolley by cables running over a series of pulleys in such a fashion that gearing-up is provided, the travel and speed of the trolley being four times the travel and speed of the ram. Actually, there are two sets of cables, one of which, as stated, transmits the thrust of the ram to the trolley, while the other is a retarding cable, and transmits the kinetic energy of the trolley to the ram, during retardation.

The power cylinder is rigidly fixed to the main structure. At one end the ram is attached to the piston, and at the other it carries eight pulleys on a cross-head. Bolted to the



THE MACTAGGART, SCOTT & CO. CATAPULT: View of left side, looking forward. In this view the catapult is extended, and the trolley is at the end of retarding travel.



DIAGRAMMATIC REPRESENTATION OF POWER CYLINDER : A is the receiver cylinder, B the cut-off neck ring, C the tapered sleeve, D the explosion unit, E the ram, F the ram cross-head, G guide rollers, H cylinder extension, I the power cylinder, and J the piston.

power cylinder is an extension carrying a neck ring and stuffing box. The piston is provided with a tapered sleeve, the greatest diameter of which is slightly smaller than the bore of the neck ring. The bore of the cylinder extension communicates with a receiver cylinder or tank. At the rear end the power cylinder terminates in an explosion chamber, and the power for catapulting may be either in the form of the combustion of cordite in the chamber, or it may be in the form of compressed air. The annular space in front of the piston, between the ram and the cylinder walls, is filled with a 50-50 mixture of glycerine and water. When pressure is generated behind the piston (either by cordite or by compressed air) the piston and ram are forced forward, the piston driving the glycerine-water mixture in front of it, and forcing it through the annular space between the neck ring and the ram, and into the receiver cylinder. At the end of the accelerating stroke the tapered sleeve of the piston enters the neck ring, thereby partly blocking the passage of the glycerine-water mixture. The pressure rises and checks the speed of the ram, and, by means of the retarding cable, the speed of the trolley. It is at this period that the aircraft leaves the trolley. The taper of the sleeve is so arranged that constant retarding pressure is maintained in front of the piston. A device known as the " spring release hook " is provided for the cross-head. This ensures that the thrust of the airscrew shall not pull the ram out of the cylinder, and is so arranged that the cross-head is not released until a force is applied to the ram considerably in excess of the airscrew pull.

The Operating Gear

The operating gear consists of four main parts : The training gear, the extending and stowing gear, the screw shaft manœuvring gear, and the air manœuvring gear.

The training gear, used for traversing, consists of a large spur wheel mounted on the ground or on the deck of a vessel below the structure. Engaging with this large spur wheel is a small pinion on a vertical shaft. This shaft is hand-operated through worm gearing, and four men can turn the catapult at the rate of 1 degree per second. As the worm gear is self-locking, the catapult cannot swing, due to the rolling of the ship.

The extending and stowing gear consists of a worm shaft driven by an electric motor, the rotation of the shaft acting on the stowing cables in such a way as to draw the two extending portions of the frame together into the middle of the fixed frame.

The screw shaft manœuvring gear is used for bringing the catapult into the stowed position, an electric motor driving a worm wheel, rotation of which moves the release hook, and hence the ram cross-head and trolley. If desired, the operation of the extending and stowing gear, and screw shaft manœuvring gear, can be done manually.

The air manœuvring gear is used to return the trolley from the forward end of the structure to the firing position, and to manœuvre it on the portion of the structure which is beyond the range of the screw shaft manœuvring gear. It consists essentially in a system of valves whereby compressed air can be admitted either to the receiver cylinder or to the explosion chamber behind the piston.

As mentioned at the beginning of this article, Messrs. Mactaggart, Scott and Co., Ltd., manufacture another model of catapult, in which the rails for the trolley are fixed to the deck of a ship, the actuating mechanism being housed below deck. The trolley is generally similar to that described, as is also the power cylinder. The only operating gear required in this type of catapult is that for running the trolley along the trackway, an operation performed by the power from an electric motor.

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New Japanese Air Representative

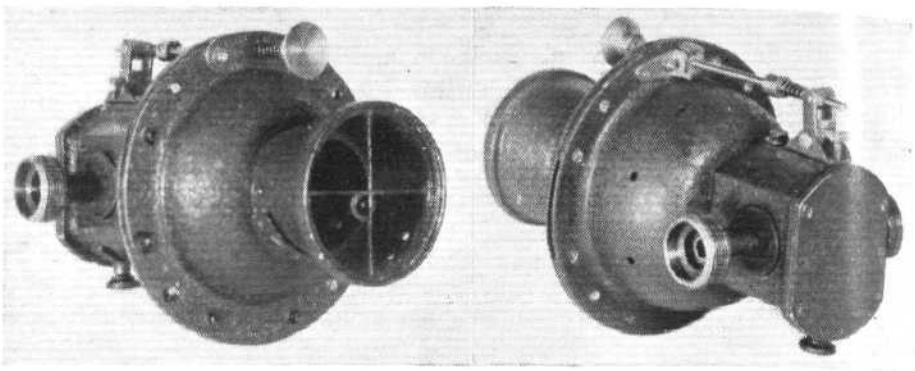
HIS many friends in this country will be sorry to learn that Engineer Lieut.-Commander J. Saiki, of the Imperial Japanese Navy, who has been in charge of the Aviation Department at Broadway Court, Westminster, for a considerable period, has been recalled to Japan. Commander Saiki has become a well-known figure wherever any event of importance occurred in the British aviation world, and his departure will be greatly regretted. We are certain, however, that his successor, Engineer Lieut.-Commander M. Ishii, will very quickly become as well known a figure as was Commander Saiki.

Long Flight by Autogiro

ONE of the latest American models of the Pitcairn-Cierva Autogiro, a PCA-2, recently completed what is claimed to be the longest flight ever accomplished on this type of aircraft. James G. Ray, vice-president of the Autogiro Co. of America, flew from Philadelphia to Miami and back, a distance of 2,500 miles. The object of the flight was to take part in the All-American Air Races at Miami, and to demonstrate the machine in several cities along the route. Speaking of the flight, Mr. Ray said : " Generally bad weather was encountered during most of the 2,500 mile trip, although the flight down the Atlantic seaboard to Miami was worse than the return journey. But it was an excellent chance to demonstrate the autogiro's ability to fly close to the ground at very low air speeds without danger of losing altitude. And the machine's performance in this respect made it a comparatively simple matter for me to ' feel ' my way through the fog and rain, and low visibility. Perhaps the worst conditions I met with, when other aeroplanes were forced to keep to the ground because of very poor visibility and the low ceiling, which was frequently less than 200 ft., were between Spartanburg, S.C., and Greensboro, N.C. I was down mighty low then and probably wouldn't have attempted flying at all, if I hadn't known the ' giro's abilities as far as forced landings are concerned. I knew I could get down all right if I had to, and take off again, from any reasonably open space. The weather conditions gave me ample opportunity to test what the 'giro can do under such circumstances." Ray made 12 stops in all during the trip, taking up more than 100 passengers on short flights. On the last lap of the return flight, he flew from Greensboro, N.C., to Pitcairn Field (about 400 miles), the 'giro's home port, near Willow Grove, Pa., in 4 hr. 10 min., landing at the Field at 5 p.m. Monday afternoon.

P.B. DEVIATORS

A Neat Type of Instrument showing Deviation from Set Course in all Directions

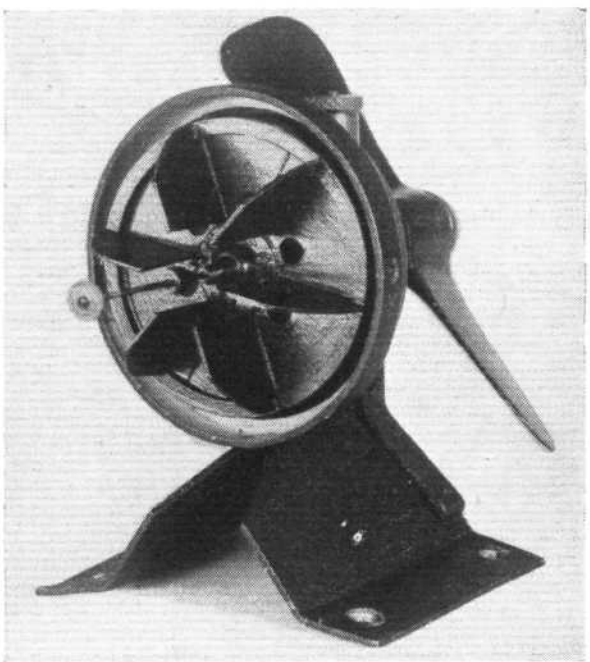


THE P.B. DEVIATORS: Two views of the shaft-driven type. (FLIGHT *Photos.*)

IN spite of all the progress made and all the instruments available, flying in fog or clouds is still shunned by most pilots, and very naturally so. All instruments, or nearly all, are known to suffer from more or less "lag," and therefore a pilot cannot be entirely certain whether or not his machine has in fact started some deviation from its intended attitude or course. True, by watching his compass, airspeed indicator, inclinometer, etc., the pilot can keep a check on this, but it is fairly obvious that the nervous strain caused by having to keep his eyes constantly roving from one instrument to another is considerable, especially when the action is accompanied by a constant readjustment of focus such as must take place when a pilot alternately looks at his instruments, and at some point far ahead of his machine.

A new type of instrument has recently been placed on the market which should go far towards reducing the strain of flying in bad visibility, as it combines in one the function of yaw indicator, pitch indicator and bank indicator as well as, virtually, airspeed indicator. The latter function, however, requires qualification, as the instrument does not, in point of fact, indicate speed, but angle. However, as the instrument shows immediately a change in pitch, it indirectly gives indication of speed alteration, since, for the same throttle setting, it is not possible for the machine to alter its angle of pitch without either increasing or decreasing its speed. Perhaps it would be more correct to say that the instrument is, indirectly, a speed-constancy indicator.

It is a feature of many great inventions that they are extremely simple, and on that basis the P.B. Deviator, as the new instrument is called, should have claim to greatness. It is, in fact amazingly simple. Briefly, the P.B. Deviator consists of two parts only: a spindle driven either by a windmill or by flexible shaft, and a rotor so mounted on the spindle as to be capable of swinging in any direction. The cleverness of the instrument, and clever it undoubtedly is, lies in the manner in which these two simple components have been thought out and coupled together.



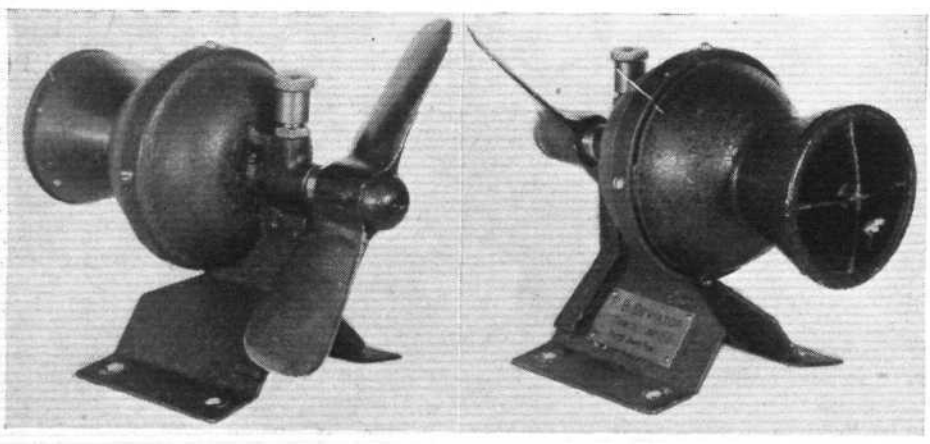
The P.B. Deviator is the invention of Mr. J. Pollock Brown, who, as many of our readers will probably be aware, was for a number of years engaged on instrument work at the Royal Aircraft Establishment, Farnborough. The driving spindle of the instrument terminates at its free end in a steel ball. The rotor has a cup-shaped centre, which fits over this ball. The rotor itself consists of a small flywheel rim carried on vane-shaped spokes. When the spindle is rotated, the friction between the ball of the spindle and the cup of the rotor causes the latter to be rotated also. As rotor speed is increased, so a point is reached at which the air resistance of the rotor vanes equals the frictional resistance in the ball-and-socket joint or bearing, and the rotor settles down to that particular speed.

Carried on a light arm from the rotor is a small disc, which lies close to the "window" of the instrument. This "window" (it may be without glass) is provided with cross wires, and all the pilot has to do is to see that the small disc lies exactly in the centre of the cross wires. The rotor of the instrument acts as a gyroscope, and when the casing of the instrument, which is, of course, fixed to the aircraft, deviates from its course in any direction, the rotor tends to remain in its previous position, and the pointer with its little disc is seen to move away from the centre of the cross wires. So sensitive is the instrument that it will indicate the very smallest turn, and it does not indicate merely rate of turn, but actual angle of deviation from the set course.

A small centering device is provided, by pressing the button of which the pilot can provide himself with a new datum line.

The P.B. Deviator is made in three models: The "Mascot" is the direct windmill-driven type, designed to be mounted on the deck fairing in front of the pilot. This model will be sold at £16. The flexible shaft type is made in two models, type B, driven from the engine, and selling at £24, and type C, which is also shaft driven, but the power for which is derived from a windmill. This also sells at £24.

We think there is little doubt that these instruments will find a very wide use, and anyone desiring further particulars and demonstrations are asked to communicate with P.B. Deviators, Ltd., Ulster Chambers, 168, Regent Street, London, W.1. Telephone: Regent 3464.



THE "MASCOT" TYPE: These two views show the direct-drive windmill model, while the photograph in the centre of the page shows the same model with casing removed to show rotor, etc. (FLIGHT *Photos.*)

THE ROYAL AERO CLUB OF THE UNITED KINGDOM

OFFICIAL NOTICES TO MEMBERS

REPORT of meeting of the Committee of the Royal Aero Club, held at 3, Clifford Street, London, W. 1, on Wednesday, February 11, 1931, at 5 p.m.

Present.—Lieut.-Col. M. O'Gorman, C.B., in the chair; Major A. R. Goodfellow; F. Handley Page, C.B.E.; W. Lindsay Everard, M.P.; Colonel F. Lindsay Lloyd, C.M.G., C.B.E.; John Lord; Captain C. B. Wilson, M.C. In attendance: H. E. Perrin, secretary; B. Stevenson, assistant secretary.

Elections.—The following new members were elected :—James Bernard Allen, Ernest Bennet Worsley Bartlett, Frances George Bowles, Robert William Burkitt, William Stafford May, Flying Officer Henry Edward Mayes, Francis Robert Walker.

Aviators' Certificates.—The following Aviators' Certificates were granted :—

9667	John Robert Chaplin ..	Airwork Fl. School.
9668	Philip Gilbert Robinson ..	
9669	Alfred J. G. Langley ..	Hanworth Club (N.F.S.).
9670	Peter Quentin Reiss ..	Leicestershire Ae.C.
9671	John McInerney	Liverpool & Dist. Ae.C.
9672	Charles Robert Rockliff ..	Liverpool & Dist. Ae.C.
9673	Cecil John Longmore ..	Hampshire Ae.C.
9674	Mounir Simaika	Phillips & Powis School.
9675	Norman Vincent Craig ..	London Ae.C.
9676	Arthur Lionel Snagge ..	Hanworth Club (N.F.S.)
9677	Sidney Packwood Jackson	Midland Ae.C.
9678	Hon. R. N. Frankland ..	Hanworth Club (N.F.S.).
9679	Richard Hilton	Hanworth Club (N.F.S.).
9680	Joan Cassels Ford ..	Hanworth Club (N.F.S.).
9681	Eileen Gilbert Bramson ..	Hanworth Club (N.F.S.).
9682	George J. A. Evans ..	Midland Ae.C.
9683	Henry G. T. Smith ..	Midland Ae.C.
9684	Benjamin Shorthouse ..	Hanworth Club (N.F.S.).
9685	Vicomtess Violette de Sibour	Airwork Fl. School.
9686	Owen Glynn Davies ..	Hull Ae. C. (N.F.S.)
9687	Stanley William Riches ..	Hampshire Ae.C.
9688	John de Filek Jago ..	Royal Air Force.
9689	William R. K. Silcock ..	Marshall's Fl. School.
9690	Stanley Jackson	Airwork Fl. School.
9691	Patrick Salmon Norris ..	Airwork Fl. School.
9692	James F. D. Beazer ..	London Ae C.
9693	Ivor G. Vaughan-Fowler	
9694	Philip William Oversby ..	Liverpool & Dist. Ae.C.
9695	Leslie James Marr ..	Hanworth Club (N.F.S.)
9696	John Hallin Ford ..	London Ae.C.
9697	William Lawton Boon ..	Lancashire Ae.C.

Gliding Certificates.—The following Gliding Certificates were granted :—

103	Percy S. Papps	Portsmouth G.C.
104	John H. Saffery	London G.C.
105	Alfred H. Turner ..	Portsmouth & Southsea G.C.
106	Herbert M. Sellers ..	Cononley & Dist. G.C.
107	George Watson	Cononley & Dist. G.C.
108	Leslie D. Dunsford ..	Surrey G.C.
109	Lady Mary Bailey ..	London G.C.
110	Evelyn Moore	North Cotswold G.C.
111	William L. Manuel ..	Channel G.C.

Vacancy on the Committee.—Commander James Bird was unanimously co-opted to the Committee of the Club to fill the vacancy caused by the death of the late Air Commodore C. R. Samson.

Schneider Contest, 1931.—The following Committee was appointed to deal with the organisation of the Schneider Contest, 1931 :—

Royal Aero Club :—Lieut.-Col. M. O'Gorman, C.B.; Lieut.-Col. W. A. Bristow; Lieut.-Col. M. O. Darby, O.B.E.; Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C.; Captain C. B. Wilson, M.C.

Air Ministry :—Major J. S. Buchanan, O.B.E.; Major G. P. Bulman; Wing Commander R. L. G. Marix, D.S.O.; Group Captain N. J. Gill, C.B.E., M.C.; Major R. H. S. Mealing.

Admiralty :—Captain C. F. Harris R.N.

S.B.A.C. :—Commander James Bird; H. Burroughes; C. R. Fairey; J. Lord; F. Handley Page C.B.E.; A. F. Sidgreaves.

Segrave Trophy.—Colonel Lindsay Lloyd and Major A. R. Goodfellow were appointed representatives of the Royal Aero Club on the Awarding Committee.

British Gliding Association.—Major H. A. Petre was appointed representative of the Royal Aero Club on the Council of the British Gliding Association.

Associated Light Aeroplane Clubs' General Council.—The meeting of the General Council was held on Thursday, February 12, 1931. Colonel Sir Joseph Reed (Newcastle-on-Tyne Aero Club), occupied the chair.

The following representatives attended: Bristol & Wessex Aeroplane Club (Col. D. C. Robinson, Capt. L. P. Winters); Hampshire Aeroplane Club (H. J. Harrington, W. Graham Gibbs); Hanworth Club (G. E. F. Boyes); Lancashire Aero Club (J. C. Cantrill); Liverpool & District Aero Club (A. Moulsdale); Leicestershire Aero Club (R. C. Winn); London Aeroplane Club (H. E. Perrin); Midland Aero Club (Major G. Dennison); Newcastle-on-Tyne Aero Club (Sir Joseph Reed, B. M. Dodds); Royal Aircraft Establishment Aero Club (P. N. G. Peters); Royal Aero Club (Lieut.-Col. M. O. Darby).

Election to the General Council.—The Southern Aero Club, Shoreham, was unanimously elected to the General Council.

Royal Air Force Co-operation at Civil Meetings.—The General Council considered a communication from the Air Council, on the subject of Royal Air Force co-operation at Civil Flying Meetings in 1931.

It was decided to apply for Royal Air Force assistance at the following meetings: Blackpool, July 8-11; Newcastle-on-Tyne, August 22.

"Tatler" Flying Scheme.—The General Council considered the scheme submitted by "The Tatler," the principal object of which was to assist in obtaining new recruits to aviation in the various districts in which the Light Aeroplane Clubs operated. The scheme, with slight alterations, was approved.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W.1.
H. E. PERRIN, Secretary.

The Schneider Trophy

THE Schneider Contest will be held between the dates, Monday, August 24, and Saturday, September 19, next. The exact date will be announced later.

No. 210 (Flying Boat) Squadron

A NEW flying boat squadron will shortly form at Felixstowe, and will be known as No. 210 (F.B.) Squadron. The type of boat with which it will ultimately be equipped has not yet been decided. At first it will receive boats for instruction, as they become available, possibly of more than one type. Wing Commander A. L. Gregory, M.B.E., M.C., has been selected to command the squadron.

The Cranwell Journal

EXCELLENT as the *Journal of the Royal Air Force College* usually is, we think that issue dated "Spring, 1931"—a little prematurely, perhaps—is well above the average. For instance, the photograph entitled "Formation," facing page 108, strikes our reviewer as one of the best things of the sort which he has seen. A poem well above the average is "The Airman," though it is written in the new fashionable style which does not scan and does not rhyme. All the same, the swing and the ideas are good. A very interesting article is the account of the flight of an "Iris" to Iceland, and we very much approve the sentiment of the closing lines: "There can be little doubt that, in spite of all its worries and trials, its scares and its parties, the flying-boat life is the one for seeing the world." And there are many other very readable articles.

The "Bluebird" (Gipsy II) arrives at Croydon. (FLIGHT *Photo.*)

MRS. VICTOR BRUCE'S RETURN

ON Friday, February 20, Mrs. Victor Bruce started her round of official welcomes at Croydon aerodrome. She arrived from Lympne with an escort of other machines a few minutes before midday, and was congratulated by Mr. F. Montague, Under-Secretary of State for Air, who in a short speech went over the chief features of her magnificent flight.

There was a fairly large gathering on the aerodrome with representatives from most of the large aeronautical bodies, including Col. Shelmerdine, our new D.C.A., Lady Elibank, the chairman of the British Aviation Hospitality Association, Col. Thwaites, Secretary-General of the Air League, the Lady Mayoress of Croydon, and Commander Perrin, secretary of the Royal Aero Club. Lady Elibank also represented the Women's Automobile and Sports Association.

Those who escorted Mrs. Bruce up from Lympne were Miss Winifred Spooner in a Bluebird, Miss Amy Johnson in her Puss-Moth, Sqdn.-Ldr. Ridley, Mr. Norman Blackburn and Messrs. Woodhead and Field, all on Bluebirds.

The whole welcome was carried through in a quiet and sensible manner and there was none of that hysterical public heroine worship; actually there could not have been more than 100 people present, but those who were were thoroughly enthusiastic and fully realised the excellence of the flight which Mrs. Bruce had made.

After the usual few speeches had been made and the press photographers had been satiated, there was a general trek towards the Aerodrome Hotel, where the select few were fortified with refreshments. It seemed rather a pity that there was not a little more order and organisation about the whole show, as actually no one could know what was going on or where they were supposed to go. The speeches of welcome were made into Mrs. Bruce's ear under the shelter of her machine, and no one else heard them. However, to have things like this was far, far better than if the occasion had been exploited by some newspaper magnate in order to boost his sales, and in doing so turned the welcome into an orgy of press publicity.

In the evening the British Aviation Hospitality Association and the Women's Automobile and Sports Association — hereinafter called the B.A.H.A. and W.A.S.A. respectively—held a dinner in Mrs. Bruce's honour at the Mayfair Hotel. It was a curious coincidence that there was another dinner being held in the same building in honour of an exploit on a "Bluebird," and that was the dinner to Sir Malcolm Campbell. Dinners at the Mayfair usually are excellent, and this one was no exception; some 200 were present, and the toast list was short.

Looked at from any angle, Mrs. Bruce's flight is really one of the most meritorious that has been made by a woman. After less than 40 hours' experience she set off—having planned the flight before even learning to fly, mark you!—and succeeded in covering nearly 20,000 miles without breaking the machine to such an extent that it could not be repaired. The country she flew over was in many places that sort of country that many would have said was impossible, and included every variety of climate, but, in spite of all these difficulties, she got through, and to all intents and purposes she never lost her way.

Readers of FLIGHT will have followed the flight through step by step as it was made, and there is no need to recapitulate it here; it will therefore suffice to mention the main route, so that readers may better be able to follow Mrs. Bruce's speech. She started from London and went via Munich and Vienna to Constantinople, thence to Konia, Bagdad, Bushire, Jask, Karachi, Allahabad, Calcutta, Rangoon, Bangkok, Korat, Hanoi, Fort Bayard, Hong-Kong, Amoy, Shanghai, Seoul, Osaka, and Tokyo. Then by boat to Vancouver and onwards to San Francisco, Louisville, St. Louis, Chicago,

The welcome at Croydon: Mr. Montague shaking Mrs. Bruce's hand, while behind her are her husband and father. On the left are Col. Shelmerdine and Lady Drogheda, and on the right Col. Saunders of Auto Auctions, Ltd., the Bluebird agents. (FLIGHT *Photo.*)

Mr. Norman, of Airwork, Ltd., welcomes Mrs. Bruce at Heston.
(FLIGHT *Photo.*)

Norfolk and New York, again by boat to Le Havre, and finally, via St. Inglevert and Lympne back to Croydon.

At the B.A.H.A. and W.A.S.A., dinner LADY ELIBANK read out a list of the people who had sent telegrams regretting their inability to be present. Before calling upon Col. the Master of Sempill, as Chairman of the Civil Aviation Section of the London Chamber of Commerce, to propose the health of Mrs. Bruce, she said she had one or two observations of her own to make about the great flight There was no doubt, she said, that women, as a rule, talk too much, and she felt that it was due to the fact that Mrs. Bruce could talk all the time she was on her flight that she was able to accomplish so much. The reference was to the Dictaphone which Mrs. Bruce had fitted in her machine, and on which she recounted her experiences as she went along.

COL. SEMPILL, in proposing Mrs. Bruce's health, said that they were greatly honoured by the presence of His Excellency the Japanese Ambassador and also by Mrs. Shelmerdine, the wife of the Director of Civil Aviation, who was here at her first function of this nature. He then referred to the fact that they also had present several well-known people who had accomplished meritorious flights, such as Miss Amy Johnson, Miss Winifred Spooner, Sir Alan Cobham, Sir Alliot Verdon Roe, and Mr. and Mrs. Bentley.

Col. Sempill said that the All-British Campaign, which was being run by an ex-R.F.C. officer, had presented Mrs. Bruce with a plaque in leather and the portfolio containing this was at his hand. He referred to the fact that when those who knew her had heard that Mrs. Bruce was organising this flight they had done all they could to dissuade her, since they felt sure that she had, so to speak, bitten off more than she could chew; she had however, confounded them all, he said, and had accomplished the seemingly impossible. He felt sure that such a flight could only have been done upon a British aircraft with a British engine, and the Bluebird which had upheld the tradition of British aircraft so nobly would now be on view at the show rooms of Auto Auctions Ltd., Burlington Gardens, in order that all might see that it was still intact.

Col. Sempill made mention of the many motoring records which Mrs. Bruce holds, and said that these alone testified to her staying powers, which were phenomenal. She also, he said, held many motor boat records, and now was becoming equally well-known in aviation. By this flight she had made the first solo flight to the Far East and Japan, the longest solo flight—19,000 miles, and the first world encircling solo flight. He further referred to several incidents of particular interest which occurred during the flight, and said that although the Bluebird more than bit the dust on at least three occasions it always came up smiling. In conclusion, he recounted the incident when Mrs. Bruce was obliged to retain the goodwill of a hoard of Baluchi tribesmen with her dancing and an alarm clock, and to mark the end of his speech he displayed the said clock before the assembly.

HIS EXCELLENCY THE JAPANESE AMBASSADOR in seconding the proposal said that he had very great pleasure and considered it a great honour to be asked to second the toast of "Mrs. Victor Bruce." Japan, he said, had followed her flight with interest, particularly since she was the first person to fly alone from England and the first lady to make a solo flight of such length. Her courage, tenacity and spirit of the English sportsman were greatly admired in Japan, and her arrival had been acclaimed with delight.

Japan, he said, was doing all it could to improve its aerial excellence, and he made reference to the work done out there by Col. the Master of Sempill for the Japanese Naval Air Service. Civil aviation was lagging behind in Japan, he said, and the exploit of Mrs. Bruce had given it a much needed impetus. Finally, he said, he would like personally to congratulate her upon her achievement and to say that he felt sure that her flight had done a lot still further to cement the cordial relationship already existing between Great Britain and Japan.

MRS. BRUCE, in reply, began with a list of those to whom she felt indebted for their help on the flight. The Air Ministry came first, since they had supplied her with 69 pages on the weather, then there was the Navy, who had burnt much coal looking for her, and the R.A.F. who had had eight machines ready to rescue her before she even started! Imperial Airways had throughout been extremely helpful, she said, and their mechanics were always ready to work all night on her machine had it been necessary. The A.A. had prepared her maps and she had ordered these, she said, before learning to fly, since she felt sure that they would take longer to get ready than she would take in learning, and in this she was right, as the maps were ready just 1 hour after she was ready to start. [We think this must be a good-natured libel on what is a well-run service.—ED.].

Mrs. Bruce then said she would like to thank all those who had come down to the aerodrome to welcome her, and she pointed out that on a flight such as she had done it was not the machine nor the pilot, but the enthusiasm of the supporters which, so to speak, got her through and made her carry on in the face of great difficulties.

She appreciated the honour, she said, of the presence of the Japanese Ambassador and Mrs. Matsudaira and she wished to thank them for coming. Mrs. Bruce then recounted some of her experiences and said that it was the funny things of the flight which had prevented her from getting worried as to whether she would be able to go through with it. At the first she was against flying and had always refused to learn, then one day she had seen a Bluebird in the windows of Auto Auctions showrooms in Burlington Gardens, and was told that it was ready to go anywhere, and in answer to her enquiry as to whether it was possible to go round the world in it, the salesman said "Of course!" After much vacillation and thought about other things she finally decided to buy it and then began to plan the flight. She laid out her route and decided on her itinerary and finally when everything was ready she went to Brooklands and told them that she must learn to fly in six days. They asked what the hurry was about and she said that she was leaving on a flight round the world in a few days time . . "Are you sure?" said a certain official at Brooklands! Anyhow she certainly learnt in a very short time, and before she had had forty hours' experience, she was ready to leave! That she got away with it testified to the training she received.

The Bluebird, she told us, weighed some 2,080 lb. when fully loaded, and at the end it came down to choosing whether she should take a dictaphone or a parachute, and her husband, a Scotsman, said she would have to leave the parachute behind, since she would not have been happy had she not been able to talk. The episode when the Baluchi tribesmen thought a Dictaphone record was chocolate has been recounted

in these pages already, as have all the details of the trip as it was made. Mrs. Bruce ran through the salient features of it, bringing in several hitherto unpublished amusing incidents, such as her being met at Jodphur and taken to a Maharajah's palace in a Rolls-Royce when, not knowing the country, she had anticipated there being brigands there.

On one occasion she stampeded a herd of elephants near Hanoi and it was rather amusing that she was subsequently presented with the Order of a Million Elephants and The White Umbrella by the Government of French Indo-China. She later also received the highest decoration of the Japanese Government for women aviators.

In conclusion she said that she thought it very wonderful that the makers of the machine should let it go out on such a trip in her inexperienced hands and that it should come back with the undercarriage intact.

The following day at Heston there was informal welcome to Mrs. Bruce by Airwork, Ltd., and Auto Auctions, Ltd. Some thirty aircraft arrived to meet her and after her arrival she gave a talk to a gathering of visitors, who included a large number of Boy Scouts and Girl Guides. Among the machines which came over was the Meteor, flown by Flt.-Lt. Armour, and the latest Spartan Arrow with Palmer wheels and brakes, flown by Col. Strange.

Mrs. Bruce at Croydon with Miss Winifred Spooner and Miss Amy Johnson. (FLIGHT *Photo.*)

On Tuesday evening, February 24, there was still another dinner in honour of Mrs. Bruce, given by the New Burlington Club, Burlington Gardens. This was peculiarly appropriate, since it was actually in this club that Mrs. Bruce first decided upon and planned the preliminary details of her flight. The club's dining room was filled to capacity with an enthusiastic gathering and Sir Rowland Hodge, Bart., was in the chair. On him devolved the duty of proposing the health of Mrs. Bruce, and in a short speech he recalled the fact that the flight was planned in the club, and he recounted some of the major details of the route Mrs. Bruce took. He also announced that the International League of Aviators had selected Mrs. Bruce as the second woman aviator of importance for 1930.

Mrs. Bruce, in reply, told her listeners how she started in July, 1930, and she divulged the fact that the salesman who finally induced her to buy the Bluebird, by his easy assurance of its powers to go round the world, was none other than Col. Saunders, or "Uncle Pat," as he is familiarly called by his friends, a director of Auto Auctions. Mrs. Bruce is an extremely attractive and witty speaker, and with such a subject as her flight to work upon, there were naturally no dull moments during her speech. Its essence was, of course, largely the same as the speech she made on the previous Friday evening, but a little more intimate, as befitted the more informal nature of the gathering. Apart from interesting details of the flight, such as the willingness of a Chinese General to stop the war and put his army on to the removal of the bunkers on the golf course in order that she might land there, Mrs. Bruce also brought out the vital fact that she was already getting inquiries for catalogues and details of the machine as a direct result of her flight, from such widely divergent places as Turkey and the U.S.A.

Bellicose Moths

FOUR Moths are being specially prepared for the Iraq Government. They will have metal fuselages, Gipsy II engines, training section wings, extra ten-gallon tanks and compass in the front cockpit, P.14 camera in the floor of the rear cockpit and a two-gallon drinking water tank in the cowling at the rear of the engine. They will be flown from the front cockpit and the rear cockpit will contain :—Wireless receiving and transmitting gear with trailing aerial, bomb release gear, Very pistol and cartridges, Essex fire extinguisher and air-tight ration container.

They will carry four 20-lb. bombs in racks under the fuselage, while the seats will be of the parachute type with de Havilland harness. When complete they will be flown to Iraq by Iraqi pilots. Sqd.-Ldr. Warburton has been lent to the Iraq Government to organise their Air Force, and is now in Baghdad, and these Moths form part of the new force.

In addition to these machines, they will also have a Moth without the added stinging power, presumably for training and communication.

EN ROUTE FOR THE CAPE: Miss Reynolds and Mr. Pudney, who will shortly be flying to the Cape by the west coast route in the first Bluebird to be fitted with a Gipsy III engine. (FLIGHT *Photo.*)

The AIRCRAFT ENGINEER

FLIGHT ENGINEERING SECTION

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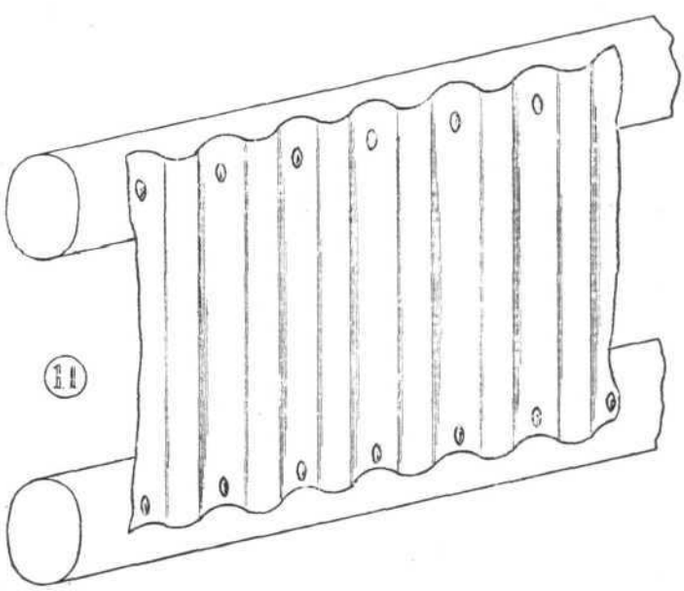
THE PARIS AERO SHOW, 1930.

By H. J. POLLARD, Wh.Ex., A.F.R.Ae.S.

(*Concluded from p.* 4).

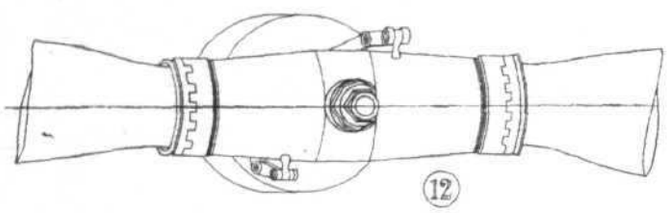
We now pass on to discuss some of the details of construction of the Junkers Junior machine. The low cantilever wings are of two-spar construction, the spars having upper and lower tubular booms. Some weight economy is obtained by telescoping one tube inside another along the span, the joint between two tubes being made by the well-known Junkers method of inserting and "holding up" a rivet in a hole several feet away from the open end of the tube, the operation of insertion and "holding-up" being carried out at the end of this 1½ in. (?) diameter tube. Similar methods are used for securing the vertically corrugated web, see Fig. 11. This is attached to one side of the spar only, while on the other side are placed at about 2 ft. pitch pieces of web, consisting of a double corrugation only. Providing the rivets are tightly clinched (and in examination of bits of Junkers structure made in this country, this has invariably been found to be the case), the only criticism relates to the stresses set up in the booms due to the offset shear members. Our own more symmetrical methods of spar construction do not lead us to simple methods of stress computation, the Junkers method still less so, but one would imagine that mechanical testing takes care of the safety phase of the subject.

A remarkable feature of the wing construction is the termination of the rear spar in the wings at a distance of from 65 to 70 per cent. of the wing span measured from the root. The aileron is continued nearly to the wing tip attached to the trailing edge, this member being merely a light channel on the sides of which the wing covering terminates. There can be no question but that the coverings on these wings, besides contributing very largely to their torsional strength, also does supply a part, and an appreciable part, of the moment of resistance against direct bending. This was easily proved by applying a hand load to the complete port wing and then repeating the operation to the partly uncovered starboard wing; the difference in deflection was startling. Since the corrugations lie across the wing, it has been assumed that their resistance to compressive forces applied at right angles to them must be negligible. Actually in the case of the Junkers it would not be surprising to know that the covering supplies at least 30 per cent. of the moment of resistance of the wing, probably much more. The body was on straightforward Junkers lines, the structure consisting of transverse hoops and the skin. In all-metal construction one of the chief problems is the joining of one part to another in a light, safe and cheap way, and this usually requires special attention to accessibility of rivets. The Junkers firm have a liking for round tubes, and with great ingenuity, as we have already seen, have devised a means of using rivets working from one



end of the tube. In the case of the fuselage, tubes again have largely been utilised for oval formers, the ends of one length of tube abutting to make a complete former. In this case it is impossible to operate from one end of the tube, and in consequence holes are made at intervals in the wall of the tube, thus enabling the satisfactory riveting of the tube to the skin. The tube is certainly weakened, but there is a minimum size for these members and undoubtedly adequate strength is retained. A similar method of joining fittings to tubes was observed on the ailerons of the Vickers machine exhibited at the last show at Olympia. In spite of this, and other aids towards cost-reduction on this light aeroplane, the cost is higher than one would anticipate, this being £795 for a landplane, and £975 for the same machine on floats, the price of a

float being of the order of £100 or so. This, one would imagine, is a fairly cheap float, but it is not easy to see why this machine should be so much more expensive than a Moth. In spite of one or two very expensive details of construction, notably the leading edges, there were two tapering tubes, apparently solid drawn, tapering from 3 in. approx. to 1in. over the whole semi-span. Such components cannot be obtained cheaply, and one ventures to say that in this detail alone is room for cost-economy.



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Another feature of the Exhibition was the large number of metal propellers on view. Indeed a wooden airscrew was an exception; moreover a large number of these propellers were of the variable pitch variety. The Ratier metal airscrew seemed the most popular so far as numbers indicated. In this design the duralumin blades are mounted in steel "blade feet," housed in "nitruré" steel hubs. Between the "blade feet" and the hubs, helicoidal inclined planes are disposed which, together with hard steel balls, form a thrust bearing having a minimum of friction. The developed equivalent depth of the planes is considerable. A system of controls about which no information was obtained is enclosed in a fixed rear crankcase. These controls determine, through the final medium of small connecting rods and spigots visible in the sketch, the rotation of the blade feet through the desired angle, resulting in the variation in pitch. An external view of the device is shown in Fig. 12. Does this cylindrical body adversely affect the engine crankcase temperature is a question that obviously arises. Opinion seems very much divided as to whether these variable pitch gears are worth while; this is rather surprising. A few simple calculations should indicate what gain in take-off and performance should be obtained, taking into account weight, and it should not be difficult to decide whether the gain would justify the cost of the mechanism. The opposition to this innovation appears to come from that school of thought which has decided that small improvements don't count.

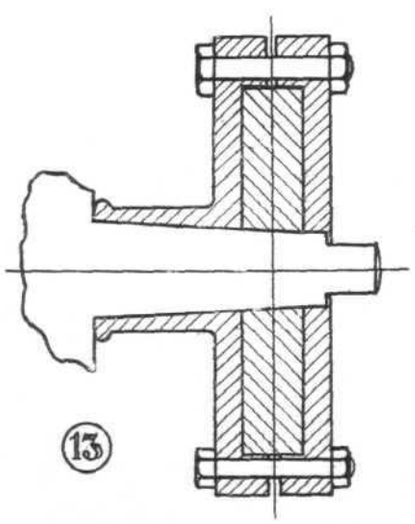
It has been usual to drill metal propeller hubs exactly as wooden hubs are drilled for securing the propeller to the engine hub with the flat sheet hubs of the Reed type. This is no longer done in France; the crankshaft projects through the central hole in the usual manner, and the fastening is done by means of plates disposed either side the propeller centre and held in position by four or six bolts, which pass just outside the propeller plate. No weakening of the plate can result, no heavy bosses are used, the back clamp plate also having a machined light projection extending aft which acts as a distance piece. This method of securing the propeller is shown in section in Fig. 13.

There are, of course, many other matters that are forced on one's notice at an exhibition such as this, in addition to methods of metal construction, and among these I found the subject of undercarriages and wheels of particular interest.

Undercarriages with straight-through axles were the exception, while of the many divided undercarriages only two were retractable, apart from the amphibian. With a thick-wing low cantilever monoplane this should be possible, and one expected to see more than two undercarriages of this type. Of these two the Couzinet, although a praiseworthy effort, would not effect much in the way of drag reduction, since it appeared as though more than half the wheels were in the slipstream, instead of the whole of the wheels being outside the slipstream when they were in the landing position; it is also doubtful if laying the radius rods, etc., on the underside of the wing would effect any reduction of parasitic drag. The Blériot monoplane, on the other hand, had a completely retractable undercarriage. It was not apparent that any undue increase in weight would be incurred with this mechanism. It appeared safe, and moreover, when retracted all the tubes and wheels faired into the wing, and thus the discontinuity on the under surface of the wings was reduced to a minimum, and a decided increase in speed should result when this undercarriage is pulled up into the wing.

Assuming the drag of an undercarriage of a machine of 5,000 lb. in weight as 25 lb. at 100 ft./sec. then at 150 m.p.h. 60 engine horse-power is required to overcome this drag, allowing a high propeller efficiency. Such simple computations provide matter for reflection, and such considerations will have important influences on fundamental decisions regarding the lay-out of a new type of aircraft, *i.e.*, as to whether the machine should be biplane or monoplane, and if the latter, if high or low wing, and what form the internal structure should take. Regarding wheels, in the automobile trade the tyre has touched two extremes, first, the high-pressure type, followed by a great demand for balloon tyres, now a compromise between these extremes has been reached and is likely to remain standard for some time. Exactly the same thing is happening with aero-wheels. Although the Goodyear air wheel has only been used extensively in America, yet the beneficial qualities of these low-pressure tyres are well appreciated, such as smooth taxying, and large area of contact for running over soft surfaces. Yet the disadvantages outweigh these advantages, and the disadvantages lay in the fitment of brakes. Consequently the Dunlop Company have developed a medium low-pressure tyre which gives a hub diameter adequate for the proper functioning of brakes and at the same time retains some of the advantages of the full balloon type. The only low pressure wheels in the Show were those fitted to the Weyman-Lepere monoplane, and those on the Puss-Moth exhibited on the Morane-Saulnier stand.

While on the Continent tension rubber cord is still much in evidence on undercarriages, yet many more machines are now fitted with other forms of shock absorber, notably the Messier Oleo pneumatic struts. The only internally sprung wheel the writer noticed was on the Bleriot, but this type of wheel has been developed by the Curtiss Company in America and is now being developed in England. Much can be argued in favour of this class of springing.



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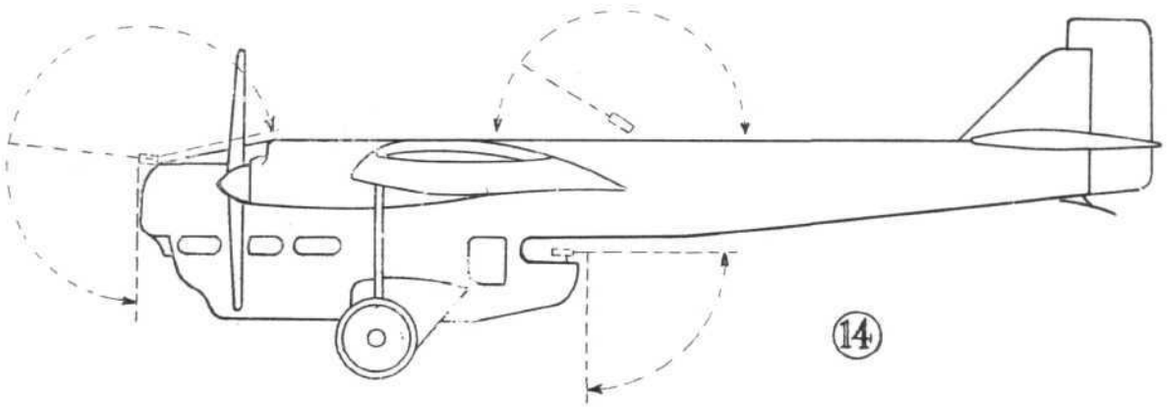
Good braking systems have been devised for aircraft wheels. Probably the Bendix-Perrot Brake is the best known, but the system developed by the Palmer Company deserves special notice. This system employs a rubber inflation tube for forcing the braking elements into contact with the drum surface. For inflating the tube, two systems are available. For large machines an air cylinder is provided, and this consists of a rubber cylinder reinforced with Palmer cord. The air is transmitted to the cylinder by means of a foot-operated valve. For small machines the pilot provides the air pressure for brake operation by means of a foot operated plunger.

We will conclude this review with a general note on the aircraft exhibited.

Civil types of aircraft formed a large percentage of the exhibits, much larger in fact than in any previous Show held since 1918. This is only natural, since the number of military machines ordered depends on legislative vote for this purpose, and this is not likely to be extended in the immediate future, rather the reverse. It is largely, therefore, in civil aviation that the future prosperity of the industry lies.



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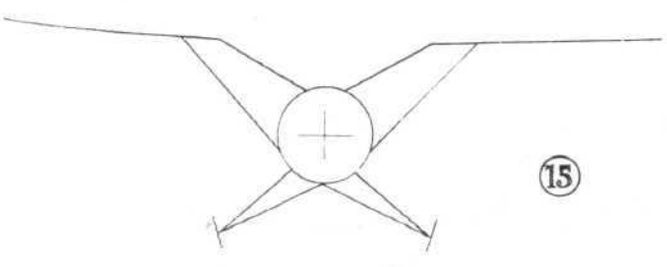
A larger proportion of monoplane structures than ever, were on view, but the pros and cons of biplanes and monoplanes have already been given in these pages. Let us now say, briefly, that in the monoplane structure, particularly the pure cantilever monoplane, we have a structure in which the component members are subjected to gradually increasing loads, and that by adopting certain methods of construction we are able to attain a structure of fairly uniform stress. This is quite impossible in the biplane as we know it now. In other words, there is much less material carrying very low stresses in a properly-designed monoplane. For this reason only, the weight of this type of structure is not greatly in excess of a biplane built to a similar performance specification. The great difficulty is the attainment of torsional stiffness with the laminar structure. This difficulty is being overcome in a number of ways. In my opinion, the monoplane type of construction is more than a mere passing phase, and it will be a long time before we see the theoretically much lighter biplane in quantity at these Shows, even at Olympia.

The use of the detachable leading and trailing edges is certainly on the increase. This arrangement offers an easy means of assembly and subsequent inspection, etc. The method of detachability was not always obvious. It would, for example, have been a matter of some interest to see exactly how the Wibault wing construction is now made.



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Returning to the question of general arrangement of the large bombing class, pride of place must be given to the Amiot. In every way, the design of this machine appeared to have been carried out most thoughtfully. Aerodynamically and structurally, it seemed to be most economic. Then, from the operational standpoint, view and room for apparatus for bombing, free arc of gun fire, etc., it would be difficult to imagine a better lay-out. This is indicated in Fig. 14. Probably the drag from the underslung cabin would be fairly high, but aerodynamic efficiency and military requirements are usually at variance, and in this case, nothing appears to have been sacrificed from the operational point of view. It is probable, however, that the down-draught from the front gun ring might be of considerable inconvenience to the bomber.

A word or two is necessary regarding the Skoda. Here, we saw a machine that certainly was very clean aerodynamically. The first criticism one had to make, was as regards the probable weights of the spars, we have no information as to what these are, but in the arrangement of lift struts and supporting surface shown diagramatically in Fig. 15, the bending arising from the component of the lift strut along the spar and the " elbow " in the spar must, for the purpose of keeping stress down, entail the use of heavy sections of metal. If there are other offsets than those visible in the structure, then the weight must necessarily be still more excessive, thus with the surface utilized putting up the landing speed, and reducing the useful load.

A comparison of the " selling points " of the various single-seater fighters exhibited would be of the greatest value. Among major considerations are top speed, landing speed and view for landing, and it was in respect of these latter qualities and of the restricted space for equipment, that this machine gave an unfavourable impression.

Other considerations, such as cost of repairs, possibility of injury to the pilot in the event of a somersault on landing (not a negligible matter in night flying or military operations) indicate that it is not necessarily the aeroplane which is extra " clean " aerodynamically which is the best for such uses. Where top speed is the main consideration, of course, everything else must go by the board.

Regarding metals, various aluminium alloys were on view, among them a light alloy called " Avial " seemed well to the fore in the matter of utility. It was claimed on the stand that this material is different from duralumin, yet its density and mechanical properties and necessary heat treatment did not indicate that it was particularly superior to that metal.

Some extraordinary forgings were exhibited on the stand.

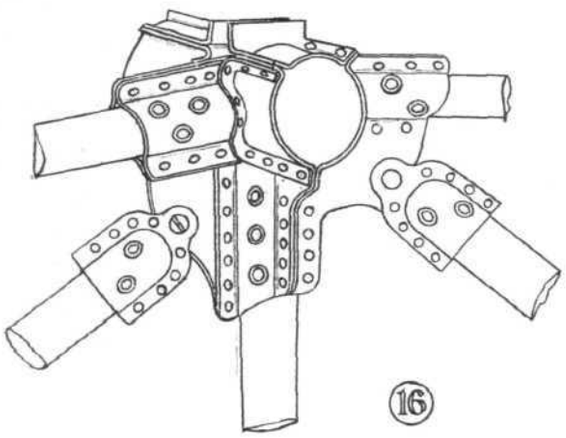
Breguet had a stripped fuselage and top centre section, and in this case no important structural modification seems to have been made. The ribs are of the type described in my review of the last show, and the fuselage is still made from separate lengths of tube, secured together through flanged fittings by means of a number of bolts.

In the galleries on the stands of die-casting specialists, stampings and pressing manufactures, etc., various types of fittings were on view. A favourite form of fitting of the latter types are shown in Fig. 16. This particular fitting was used on the Amiot 140, but Breguet and other French constructors favour this pressed plate type of fastening. Hollow spun rivets are used in this case. Small hollow rivets and small cup rivets are extensively used on the Continent for securing the sheets of *monococque* bodies.

Welding was not much in evidence, apart from the Fokker, the only other machine having a primary welded structure in part was the Weymann.

We have made rather wide reference to *monococque* bodies. One of the favourable features of this type of construction lies in the freedom from internal obstruction. Nearly the

same freedom can be obtained in the girder type of body as demonstrated on the Guillemin J.G.40. In this case the longerons and struts were of square section tube, built up into N type girders. Stiff gusset plates at the transverse corners gave all the stiffness necessary, and probably considerable damage could be inflicted on the side bracing members without causing the collapse of the fuselage by virtue of the stiffness of the bulkhead panels. This feature of fuselage construction is not unknown in this country.



It is often stated that information regarding latest developments either structurally or in any other direction are not obtainable at these exhibitions for the reason, it is alleged, that exhibitors are loath to give any ideas or secrets away. This is not borne out by experience. A constructor has more to gain by demonstrating that he is well to the forefront in progress and improvement than by keeping information back from possible clients. The patent laws are intended to give security, and should aid the real inventor in obtaining his due; again, one improvement follows another, and that which is prized this year as being ahead of contemporary effort may well be in the background or obsolete when the next show comes due. On the whole, therefore, it pays to exhibit anything which may indicate progress. The great danger, however, lies in over-optimism or exaggerated claims. In the belief that this is the general view of most workers in the aircraft industry, we welcome these Aeronautical Exhibitions as being important factors in Aircraft Development.

TECHNICAL FEATURES OF THE AIR MAIL.

By FRANK RADCLIFFE, B.Sc., A.M.I.A.E., A.R.Ae.S.

(*Continued from page* 94, *December* 26, 1930)

VI.—Progress in Air Mails.

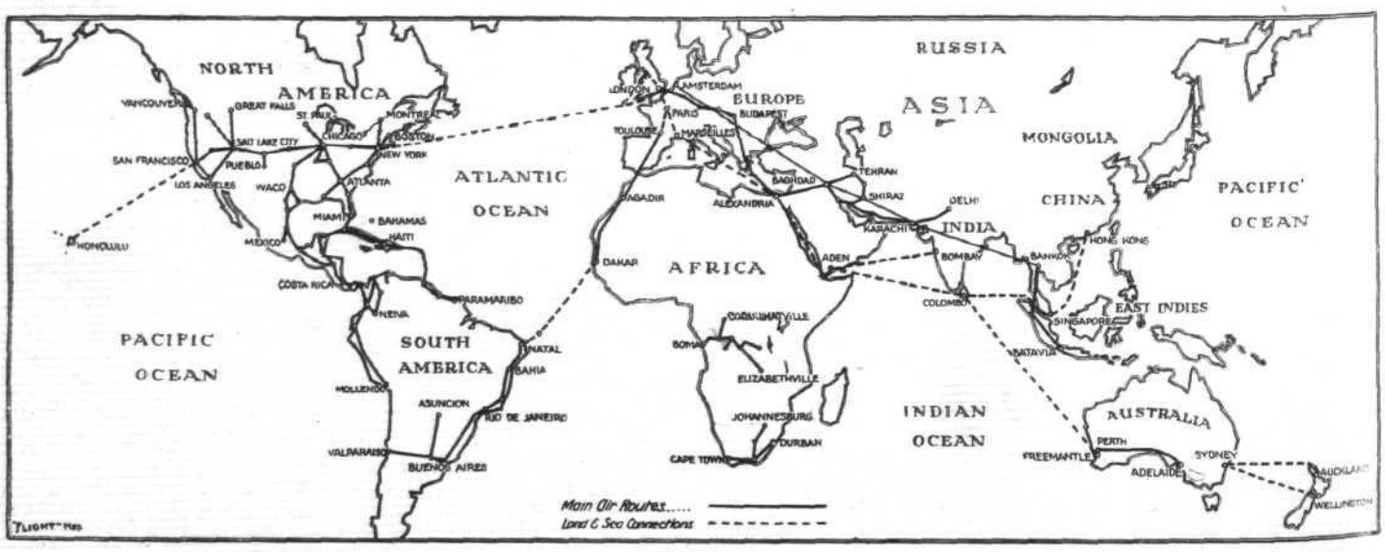
A fully detailed survey of the progress of air mail services during 1930 cannot be given until the yearly statistics are available. It will be possible, however, to discuss briefly the progressive tendencies of 1930 and indicate possible means of development in the near future.

The writer feels certain that air mail services will rank as outstanding factors in the development of industry during the next two decades, but the immediate success of such high speed services will only be attainable after intensive research and carefully planned development work has been pursued. As the Postmaster-General has pointed out, on several occasions, the Post Office puts *reliability* before speed and, unfortunately, even the most enthusiastically air-minded people must agree that air services at the present time are by no means 100 per cent. efficient from the point of view of reliability. With existing forms of mail conveyance it is possible to address a letter to any part of the earth and feel certain that the chances of that letter not reaching its destination are very remote indeed. It may also be added that for the recognised regular routes there will be a regularity in the mail service which can be relied on. It seems reasonable to assume, however, that if by air mail services a high degree of reliability and regularity of service could be guaranteed, the ordinary business man would welcome its introduction among the ordinary channels of communication and if, at first, the acceleration it afforded was only small this would not debar its introduction.

It will generally be conceded that the aeroplane, as we see it to-day, has been very largely influenced by military requirements. *Speed* and *efficiency in design* are two of the outstanding requirements and it has been put forward by many that the single-seater fighter of to-day with a top speed in the neighburhood of 200 m.p.h. is the ideal type for conversion into the mailplane of to-morrow. This does not appear to be the correct way of looking at the problem, for whereas speed and aerodynamic efficiency in a single-seater fighter are of paramount importance and the life of the aircraft correspondingly of less, the reverse obtains in the case of commercial aircraft. *Safety, immunity from forced landings and* 100 *per cent. efficiency of service must be the primary consideration*, and the same forethought that has been necessary to make mail boats and mail trains dependable will be required for air mail services. Such considerations as the above rule out the spectacular and thrilling aspect of flying for commercial work and in its place must be introduced that dignity and dependability that aviation needs above all else to-day. It would appear that the sooner we can make flying commonplace and the more we can do to equip the modern aeroplane with dependable power units the more rapid will be its application.

Actual Progress Made.

Present indications, from all over the world, appear to show that air mail services are being regarded seriously and as a necessary part of the equipment of the nations for carrying on important personal and commercial business. To all whose welfare is wrapped up in the success, or otherwise, of the aircraft industry, this comes as a most welcome omen, and in order to show how one can take these indications as being trustworthy, actual available figures will be



given of what is taking place both in the Empire and abroad. (See Map 1 on previous page.)

British Empire.

During the quarter-year ended September 30, 1930, 11·9 tons of letter air mail were carried from England. This was an increase of 20 per cent. over the corresponding quarter of 1929. The details of the services are given below :—

	Quarter ending September, 1929. Lb.	1930. Lb.
India, Iraq, Palestine, and Egypt ...	8,548	11,547
Iraq (by air from Gaza)	3,430	No service.
Australia, internal services ...	967	1,402
South Africa internal service ...	357	2,076
Other extra European destinations	1,256	1,500
Continental air service	7,519	9,982
Total services	22,077 lb.	26,507 lb.
	9·85 tons	11·9 tons.

The introduction of blue air mail posting boxes in the London area appears to have been contributory to attracting additional traffic, as the air mail for the European countries alone increased by 33 per cent. as compared with the quarter ended September 30, 1929.

As an indication of the total air mail and freight traffic that has to be dealt with in the course of a year, the following are given for 1929 :—

	Tons of Air Mail.	Tons of Freight.
Great Britain (including all Imperial airways)	99·2	839·7
Australia	33·8	100·3
Canada	194·2	1,742·8
South Africa	1·3	—
New Guinea	2·0	867·5
Total services	330·5 tons	3,550·3 tons.

(As a point of interest, it may be assumed that letters work out at the rate of 89,600 to the ton.)

India.

The 6,000 miles of Empire airway to India were opened on March 30, 1929, and the use made of this service for mail has been quite gratifying. During the first five months of its life the weekly mail to India rose at the rate of 2,000 per week from 12,000 letters (but even so, there is still tremendous room for its growth, as the total weekly mail leaving this country for India is of the order of 11,000 lb.). The G.P.O. publish, at frequent intervals, details of the Indian service, and copies of the leaflet can be obtained free at any head post office. The present service is weekly from London, the mail closing at G.P.O., London, every Saturday at 6 a.m. The saving in time to Delhi is 7½ days over the usual 16 days by boat and train.

On December 30, 1929, the Indian State Air service extended the air mail to Delhi. As soon as practicable the service will be extended to Calcutta and Rangoon with aircraft owned and operated by the Indian Government. Mails only will be carried at first, and it is hoped to get the Karachi to Delhi section equipped for night flying during 1931–1932.

Australia.

Commercial flying has been developing steadily in Australia, and the following table gives an idea of this growth :—

	1924.	1925.	1926.	1927.	1928.	1929.*
Freight (lb.)	8,498	29,103	88,926	134,205	144,955	224,697
Letters (numbers)	204,472	259,505	287,647	301,971	308,883	391,298

* This does not include the letters carried on the Perth–Adelaide route (1,453 mls.), which was opened June 2, 1929, and which, in itself, accounted for 27,003 lb. (approximately 1,080,000 letters if reckoned at 40 letters to the 1 lb.). This is really a remarkable service, and its success may be attributed to the fact that it saves six days in getting a reply to a letter over the normal system. (Further illuminating particulars of the Australian air mail services can be seen in FLIGHT, October 17, 1930, pp. 1145 and 1146.)

New Zealand.

There are no regular air services at present, and the linking up by air of New Zealand with Australia is really essential before internal routes can be opened up. The Post Office of New Zealand has asked for tenders for Dominion air mail services, but an immediate subsidy is not to be paid. On the other hand, the contractors can have receipts on air mail stamps, less a certain percentage.

South Africa.

1931 should see the establishment of an important air mail service linking up the Cape with England and Europe. It is not proposed to say very much here concerning this service, as it has been dealt with very fully in the press. The African route will be a splendid example of what the co-operation of various countries can achieve, and subsequent results should enable one to see what a valuable asset air mail services can be in speeding up commerce generally.

Canada.

There is an interesting record of air mail development in Canada, for the introduction of air mail services to outlying districts has opened up new parts, especially in the mining districts in the sub-arctic and in N. Ontario.

The wide variation in the climatic conditions of Canada has led to certain features being adopted as standard. Water-cooled engines are not used; maintenance must be the minimum necessary. The high wing monoplane is the type preferred, incorporating a single engine. What is required in Canada is an aeroplane landing-gear that combines wheels, floats and skis, as all three may be required at different stages.

During 1929 the Commercial aircraft companies of Canada carried 430,636 lb. of mail and 3,903,908 lb. of freight and express parcels with no loss of mails or damage. The service was interrupted at times by bad weather conditions and forced landings.

Mail carried in 1927 was 14,684 lb., and in 1928 was 316,631 lb.

Newfoundland.

Newfoundland is hoping to begin an experimental mail service this year. The contract calls for six two-way trips from St. John's to towns in the N. Peninsula. The distance of a single trip is 720 miles, and there will be one flight per week. The aeroplanes are to have a carrying capacity of 300 lb. of mail.

Transatlantic Air Mail Service.

Much publicity has been given of late to the question of the practicability of such an air service, operating from, say, Charleston or New York *via* Bermuda and the Azores to Europe. The stages would be, roughly, 700, 2,000 and 900 miles, respectively. A discussion of this proposed service is left to the last section of this article. The use of such a service will be apparent to all.

An alternative scheme at present under consideration is one which uses aeroplane and mail boat, and would combine the interests of Imperial Airways, the Cunard and White Star Lines. With this scheme, India would be 14 days from San Francisco, and New York 11 days from India. Later, there would be a possibility of connecting up with the S. African airway, which would save a considerable amount of time for carrying specie and urgent documents. The interest gained on the time saved in transporting bullion, it is believed, would more than counterbalance the added expense of such a service. (Interest per day on £1,000,000 at 5 per cent. £137.)

United States of America.

It is to the United States that one must look to see how great an effort has been made to make the application of air

mail services general. The value of night air mail services has been appreciated by the Department of Commerce, and in order to make it practicable 14,000 miles of lighted airways have been installed. During the first half of 1930, the internal airlines of the U.S.A. carried 3,571,956 lb. (1,600 tons) of air mail, for which was paid $4,737,441. The most important service apparently being the San Francisco-Chicago (1,932 miles) (Boeing Air Transport), which accounted for 925,485 lb. (413 tons) for the six months. The second in importance is the Chicago-New York (717 miles) (National Air Transport), which accounted for 809,141 lb. (361 tons) for the six months.

The latest figures to hand indicate that on November 15, 1930, the miles of airway operating mails in U.S.A. were 41,601 miles out of a total of 49,529 miles, and the average daily mileage schedules having a contract for mail was 75,370 miles out of a total of 116,605 miles for all services.

The United States began their Transcontinental Air Mail Service from New York to San Francisco on a joint basis, *i.e.*, the mails went by air during the day and by train at night. However, it was soon realised that if air mail was to have its fullest advantage it must fly on a 24-hour day basis. In consequence, the Central West was equipped with a lighted airway, and by this means it is possible for planes to leave New York at daylight, fly through the Central region at night and complete the journey by air the next day.

Four years ago, when the Post Office Department of U.S.A. turned over the air mail services to the Aeronautics Branch of the Department of Commerce, there were 2,000 miles of lighted airways on a line between New York and Salt Lake City. To-day, there are 14,000 miles of airways fully equipped for night flying. A substantial portion of them have complete radio equipment for direction and communication, and practically all have comprehensive weather reporting service. The program in hand calls for 25,000 miles of trunk line airways. An idea of the progress being made in the U.S.A. will be apparent from the above few facts, but it is just as well to remember that at the present time the Post Office of America is not making a profit, and the deficit on Air Mails last year amounted to something like £1,400,000, which represents the subsidy necessary to air line operators during the experimental period.

(To be continued.)

TECHNICAL LITERATURE

SUMMARIES OF AERONAUTICAL RESEARCH COMMITTEE REPORTS

These Reports are published by His Majesty's Stationery Office, London, and may be purchased directly from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, W.C.2; 120, George Street, Edinburgh; York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square West, Belfast; or through any bookseller.

WIND TUNNEL EXPERIMENTS WITH CIRCULAR DISCS. By L. F. G. Simmons, M.A., A.R.C.Sc., and N. S. Dewey, M.A. R. & M. No. 1334 (Ae. 467). (6 pages and 10 diagrams.) February, 1930. Price 9*d*. net.

In continuation of the development of methods for photographing air flow a series of photographs of eddying motion were taken, with smoke used to render the flow visible, and an electric spark to serve as the source of illumination. The flow selected for examination was the wake behind thin, circular discs, which was known to undergo a marked transformation from laminar to eddying motion, within the VD/ν range available in the 1-ft. wind tunnel. Thus, by such a means an unsteady type of flow could be readily produced and emp oyed as a subject for testing the photographic technique, from the results of which a judgment could be formed of the probable value of the method for purposes of boundary layer investigation.

The photographs appended to the report show that the method adopted is capable of revealing satisfactorily the characteristics of eddying motion in the wake of a disc up to a wind speed of about 5 ft./sec. At higher speeds the method fails owing to the rapid diffusion of the smoke and the consequent reduction in opacity.

The results provide an interesting comparison with those of T.2884 (revd.).* It is shown that at the lowest Reynolds numbers a permanent vortex exists at the rear of the disc closely resembling that recorded in the water experiments. A change from this condition of flow to another type occurs, as in the water experiments, but at a lower value of VD/ν; it is suggested that this lack of correspondence may be due to turbulence present in the free stream of the air flow.

* To be published shortly. T.2884 (revd.). "On the Eddy System in the Wake of Flat Circular Plates in Three-Dimensional Flow." T. F. Stanton and D. Marshall.

THE STRESSES IN A RADIALLY SPOKED WIRE WHEEL UNDER LOADS APPLIED TO THE RIM. PART II.—SIMPLIFIED FORMULÆ AND CURVES. By Prof. A. J. Sutton-Pippard, M.B.E., D.Sc., M.Inst.C.E., and W. E. Francis, M.Sc. R. & M. No. 1337 (Ae. 468). (10 pages and 11 diagrams.) July, 1930. Price 9*d*. net.

An analytical and experimental investigation of the stresses in a radially-spoked wire wheel when acted upon by a radially-applied load, described in an earlier paper,* led to certain formulæ for the calculation of spoke loads and rim reactions in such wheels. These formulæ are based on the assumption of a large number of spokes, but it was shown that reasonable accuracy was obtained when the number was as low as twenty-four.

A more detailed arithmetical investigation has shown that they can be considerably simplified at the expense of a very small loss of accuracy, and in the present paper these simplified formulæ and curves plotted from them are presented in a form suitable for design purposes and for further investigations which it is proposed to carry out.

* The stresses in a radially-spoked wire wheel under loads applied to the rim. A. J. Sutton Pippard and W. F. Francis.

STALLED FLIGHT TESTS ON A BRISTOL FIGHTER FITTED WITH AUTO CONTROL SLOTS AND INTERCEPTORS. By R. P. Alston, B.A., and Pilots of Aerodynamics Flight, R.A.E. Communicated by the Director of Scientific Research, Air Ministry. R. & M. No. 1338 (Ae. 469). (3 pages and 1 diagram.) June, 1930. Price 4*d*. net.

An "interceptor" consists of a narrow plate which may be raised to a position approximately normal to the upper surface of a wing. It is placed close behind an open slot, and nullifies the effect of the slot, producing an increase in drag and reduction in lift. The interceptor is arranged to come up when the aileron on that wing is raised. In the course of their experiments Messrs. Handley Page found that the most effective position of the interceptor was very close behind the trailing edge of the slat; this necessitates the interceptor being housed in a recess, which is covered by the slat when the latter is lying against the wing as in normal flight.

A D.H. Moth fitted with autoslots and interceptors was tested in stalled flight by R.A.E. pilots in November, 1929,* and the control was reported to be very good. On that aeroplane the interceptors were operated directly by the ailerons through a lost motion device, thus allowing small aileron movements for normal flight without causing the interceptor to come into action. On the Bristol Fighter the slat, interceptor and aileron are interconnected by a mechanism which only allows the interceptor to come up when the slat is forward; when the slat is back, as in normal flight, full aileron may be applied witout causing any fouling of the slat and interceptor.

The lateral control at the stall of the Bristol Fighter fitted with this control is very good. The mechanism in its present form does not permit the interceptor to have sufficient movement to affect the motion in a spin. A three-axis rate of turn recorder has now been fitted, and measurements of the motions resulting from the use of the control at the stall are being made.

* R. & M. 1292. Stalled flight tests on a Moth fitted with slots and interceptors, Jones, Maitland and Purdin.

FULL SCALE EXPERIMENTS ON HIGH TIP SPEED AIRSCREWS. THE EFFECT OF THICKNESS OF SECTION ON AIRSCREW PERFORMANCE. By W. G. Jennings, B.Sc., and A. Ormerod, B.Sc. Communicated by the Director of Scientific Research, Air Ministry. R. & M. No. 1339 (Ae. 471). (6 pages and 8 diagrams.) August, 1930. Price 6*d*. net.

Full-scale experiments on high tip speed airscrews are described in R. and M. Nos. 1173 and 1282*. The latter report deals with comparative performance tests of three airscrews of different sections, with thickness/chord ratios varying from 0·12 to 0·10. The present report continues the investigation of the effect of high tip speeds on airscrew performance, and deals with full-scale comparative tests of airscrews with different thickness/chord ratios.

Performance tests of three conventional section airscrews with mean thickness/chord ratios of 0·10, 0·08 and 0·06 respectively, have been carried out in a single-seater aircraft. The first two airscrews were tested at various pitch settings of the blades. The results have been compared with wind tunnel tests on similar airscrews working at low and at high tip speeds.

The 0·10 thick airscrews show a serious drop in efficiency when the tip speed exceeds the velocity of sound. For a pitch/diameter ratio of 0·56 this decrease in efficiency is of the order of 20 per cent. The 0·08 and 0·06 thick airscrews both show a decrease in efficiency of about half this amount.

A direct comparison of the 0·10 thick airscrew with a high-speed model airscrew of similar thickness appears to indicate that there is no serious scale effect on maximum efficiency or torque coefficient.

The wind tunnel experiments will be extended shortly by tests of an airscrew of 0·06 thickness/chord ratio, and by some further tests of the 0·08 section. A fuller comparison of tunnel and flight results will then be possible.

* R. and M. 1173 and 1282. Full-scale experiments on high tip speed airscrews, by W. G. Jennings.

ENGINES AT PARIS SHOW

The tables of engine data which accompanied Captain Swan's article on engines at the Paris Aero Show, and which had to be held over last month, will be found on the following two pages.—ED.

GREAT BRITAIN.

	Name of Engine	Type	Cooling		Normal and Max. h.p.	Normal and Max. r.p.m.	Bore and Stroke	Compression Ratio	Gear Ratio	Weight, lb.	Starter	Remarks
Armstrong-Siddeley.	*Genet	5-Cyl. Radial	A	U	82—88	2200—2420	In. 4×4	5·25	—	—	Hand turning	—
	*Genet Major	5 " "	A	U	103—110	2200—2420	4·25×4·5	5·35	—	—	"	—
	* "	7 " "	A	U	140—155 145—155	2200—2420	4·25×4·5	5·35	— 0·663	—	"	—
	*Mongoose	5 " "	A	U	155—165	1850—2035	5×5·5	5	—	—	"	—
	*Lynx	7 " "	A	U	220—235	1900—2090 2000—2200	5×5·5	5	— 0·657	—	Gas and inertia or hand turning	Supd. type, 200 b.h.p. at 11,500 ft. Direct drive.
	*Lynx Major	7 " "	A	U	260—282	2000—2200	5·25×5·5	5	—	—	"	Can be fitted with geared fan.
	*Double Mongoose	10 " "	A	U	342—350	2200—2420	5×5·5	5	0·657	—	"	—
	*Jaguar	14 " "	A	U	416—446 470—495	1700—1870 2000—2200	5×5·5	5	— 0·657	—	"	Supd. type, 400 b.h.p. at 14,500 ft. Geared and supercharged, 430 b.h.p. at 13,500 ft.
	*Jaguar Major	14 " "	A	U	507—549	2000—2200	5·25×5·5	5	0·657	—	"	G.F. 525 b.h.p. at 3,000 ft. normal r.p.m. Supercharged type, 500 b.h.p. at 12,000 ft. normal r.p.m.
	*Leopard	14 " "	A	U	740—800 815—840	1500—1650 1700—1870	6×7·5	5	— 0·633	— —	"	
Bristol.	Jupiter VI, F.H. F.S.	9-Cyl. Radial	A	U	420—450† 435—465†	1700—1870	5·75×7·5	5·8 6·3	—	775	Gas and hand turning	†B.h.p. at 4,000 ft.
	Jupiter VI, F.L. F.M.	9 " "	A	U	445—480 465—500	1700—1870	5·75×7·5	5·15 5·3	—	775	"	—
	" VII, F.	9 " "	S		480—520†	1775—1950	5·75×7·5	5·3	—	810		†B.h.p. at 10,000 ft.
	" VIII, F.	9 " "	A	U	460—480†	2000—2200	5·75×7·5	5·8	0·5	900	"	†B.h.p. at 4,000 ft.
	" XI, F.	9 " "	A	U	490—525 515—545	2000—2200	5·75×7·5	5·15 5·3	0·5	900	"	—
	*Mercury IV, A.	9 " "	A	S	490—520†	2250—2480	5·75×6·5	5·3	0·656	950	"	†B.h.p. at 13,000 ft. Auto. Boost control.
	" V A. B.	9 " "	A	S	525—550†	2000—2200	5·75×6·5	5·3	0·656 0·5	995	Gas and inertia or hand turning	†B.h.p. at 11,000 ft. Auto. Boost control
	" VI A. B.	9 " "	A	U	535—575	2000—2200	5·75×6·5	5·3	0·656 0·5	965	"	—
	" VII A. B.	9 " "	A	S	555—570†	2000—2200	5·75×6·5	5·3	0·656 0·5	995	"	†B.h.p. at 4000 ft. Auto. Boost control
	" VIII A. B.	9 " "	A	U	535—575	2000—2200	5·75×6·5	5·3	0·656 0·5	985	"	—
Rolls-Royce.	F XI, FXIV, FXII, A.	12-Cyl. 60° V.	W	U	490—560	2250—2700	5×5½	6	0·632 0·475 0·552	865	Hand turning	*One of "F" and "H" type at Show.
	* " B.	12 " "	W	U	480—530	2250—2700	5×5½	7	0·632 0·475 0·552	865	"	—
	" M.S.	12 " "	W	S	500—620†	2250—2700	5×5½	5·5	0·632 0·475 0·552	900	"	†B.h.p. at 3,000 ft.
	" S.	12 " "	W	S	480—550†	2250—2700	5×5½	6	0·632 0·475 0·552	900	"	†B.h.p. at 11,500 ft.
	H XII, M.S. H XIV, M.S.	12 " "	W	S	825—920	2000—2300	6×6·6	5·5	0·553 0·477	1460	Gas and hand turning	

FRANCE.

	*Chaise AV2	4-Cyl. Inverted V	A	U	110—	2000—	m.m. 120×140	5·5	—	—	—	Also make 12-h.p. air cooled Inverted V engine.
Farman.	*7 E.A.	7-Cyl. Radial	A	U	165—200	2150—	115×135	—	Geared	352	—	—
	*9 E.A.	9 " "	A	U	210—260	2300—	115×120	—	"	584	Inertia (Electric)	—
	*8 V.I.	8-Cyl. Inverted V	W	S	350—400	2400—	135×140	—	"	—	Farman Cartridge	Rateau blower fitted Gear driven.
	*12 W.I.	12-Cyl. Inverted W	W	S	550—650	2400—	—	—	"	880	" "	" "
	*18 W.I.	18 " " W	W	S	600—750	2800—	110×125	—	"	928	" "	" "
Gnome & Rhone.	*Titan II, 5 Bc.	5-Cyl. Radial	A	U	255—	1800—1900	146×165	5·3	—	562	Gas (Viet.)	Sabathe cartridge starter can be fitted.
	*Titan 5, Kc., Kdr.	5 " "	A	U	285—	2000—	146×165	5·8	— 0·66	528	Gas and inertia or hand starting	Mixture fan fitted.
	*Titan Kb. Major 7, Kbr.	7 " "	A	U	370—	1950—2050 2000—2100	146×165	5·5	— 0·66	627 682	" "	Direct drive supercd type, 7 Kbs. Mixtur fan on Kb. and Kbr.
	*Jupiter VII, 9 ASb.	9 " "	A	S	510—575†	2000—2100	146×190	5·3	—	858	Gas	†B.h.p. at 13,000 ft.
	*Mercure V	9 " "	A	S	530—575†	2000—2200	146×190	5·3	0·65 0·5	945	Gas	†B.h.p. at 11,000 ft.
Hispano Suiza.	*9 T	9-Cyl. Radial	A	—	220—225	1800—	130×170	16	—	682	—	Heavy-oil Engine. Clei get licence.
	*9 Q.	9 " "	A	U	250—310	2000—	127×140	5	—	598	—	Wright Whirlwin licence.
	*6 Pa.	6 " Line	W	U	100—145	2000—	110×140	5·5	—	374	—	New engines have nitro gen treated cylinden with special supple mentary lubricatio system for immediat take-off without pre liminary warming u
	*8 Ad	8 " V	W	U	180—210	1800—	120×130	5·3	—	462	—	
	*6 Mb.	6 " Line	W	U	250—280	2000—	130×170	5·5	—	594	—	
	*8 Fb.	8 " V	W	U	300—320	1800—	140×150	5·3	—	583	—	
	*12 Jb.	12 " V	W	U	400—460	2000—	120×150	6·2	—	781	—	—
	*12 Hbr	12 " V	W	U	500—580	2000—	140×150	6·2	Geared	1034	—	—
	*12 Gb	12 " V	W	U	500—585	2000—	140×150	6·2	—	860	—	—
	*12 Lb	12 " V	W	U	600—630	2000—	140×170	6·2	—	970	—	—
	*12 Nb	12 " V	W	U	650—750	2000—	150×170	6·2	—	1045	—	—
	Nbr				650—740				Geared	1144		
	*18 Sb	18 " W	W	U	1000—1125	2000—	150×170	6·2	—	1189	—	—
Lorraine.	*100 h.p. *220 h.p.	5-Cyl. Radial	A	U	100—110 110—125	1350— 1650—	125×140	5·0	—	344 348	—	A 9-cyl. radial heavy-o engine. 250-h.p. also made.
	*120 h.p.	5 " "	A	U	120—150	1700—	130×140	5·25	—	354	—	—
	*Pilsar	7 " "	A	U	240—283	1800—	140×150	5·0	—	583	—	—
	*Abrel	9 " "	A	U	300—370	1800—	140×150	5·0	—	652	—	—
	*Antares	14 " "	A	U	500—595 500—580	1900—	140×150	5·0	— 0·648	930 1022	—	—
	*	12 " W	W	U	450—486 450—490	1850— 1900—	120×180	6·0	— 0·648	820 908	—	—

* Engines at Show. S Supercharged. U Unsupercharged.

FRANCE—*continued.*

	Name of Engine	Type	Cooling		Normal and Max. h.p.	Normal and Max. r.p.m.	Bore and Stroke	Compression Ratio	Gear Ratio	Weight, lb.	Starter	Remarks
Lorraine.—contd.	*Pétrel	12-Cyl. V	W	U	500—675 500—732	2200—	m.m. 145×145	6·0 7·0	— —	818	—	0·665 gear reduction can be fitted: 875 lb. with reduction gear.
	*Courlis	12 ,, W	W	U	600—765	2000—2400	145×160	6·0	—	930		
	*	18 ,, W	W	U	650—720	2000—	120×180	6·0	Geared ,,	990 1285	Gas (Viet.) —	—
	*Orion	18 ,, W	W	U	700—870	2100—	125×180	6·0	,,	1250	—	—
	*Eider	12 ,, V	W	U	900—1050	2200—	170×165	6·0	—	1275	—	—
									Geared	1400		
Michel.	*AM 7	6 Cyl. Line	W	U	200—	1700—	127·2×178	5·5	—	—	—	—
	*AM 14 15	4 ,, ,,	A	U	100—120 110—130	1600— 1700—	125×150	5·1	—	341	—	—
Panhard.	*Clerget	9-Cyl. Radial	A	—	100—	1800—	120×130	—	—	504	Compressed air	Heavy oil engine.
	*12L	12 ,, 60° V	W	U	500—525	1700—	140×170	5·4	—	1010	,,	Valveless.
	*Peugeot Diesel	6-Cyl. Line	W	—	600—	1500—1600	120×210	12·0	0·6	—	—	Heavy-oil opposed pistons, Junkers type, two crankshafts.
Renault.	*	4-Cyl. Line	A	U	95—100	2000—	115×140	5·2	—	297	Hand	—
	*	7 ,, Radial	A	U	100—120	2000—	100×120	5·2	—	308	Gas (Viet.)	—
	*	9 ,, ,,	A	U	250—270	1820—	125×150	5·2	—	583	,, ,,	—
	*12Ja				470—	1800—			—	792		
	12Jb	12 ,, V	W	U	507—	2020—	125×170	5·6	—	913	,, ,,	Centrifugal oil cleaner.
	12Jc				522—	2100—			Geared	847		
	*12 Kg Kt	12 ,, V	W	U	562— 628—	1800— 2050—	134×180	5·6	— —	1057 1062	,, ,,	,, ,, ,,
	*18 Ja	18 ,, W	W	S	880—	2100—	125×170	5·6	Geared	1365	,, ,,	Turbo compressor fitted.
Salmson.	3 AD	3-Cyl. Radial	A	U	16—18	2000—2400	70×86	5·6	—	75	—	—
	6 AD	6 ,, ,,	A	U	25—	1900—	70×86	5·6	—	132	—	—
	*9 AD	9 ,, ,,	A	U	46—	2000—	70×86	5·6	—	154	—	—
	5 AC	5 ,, ,,	A	U	60—	1800—	100×130	5—5·4	—	242	Gas	Carb: fitted with automatic altimetric corrector.
	*7 AC	7 ,, ,,	A	U	95—	1800—	100×130	5—5·4	—	285	,,	,, ,, ,,
	*9 AC	9 ,, ,,	A	U	120—	1800—	100×130	5—5·4	—	374	,,	,, ,, ,,
	*9 NCT	9 ,, ,,	A	U	150—	1800—	100×140	5·1	—	308	—	Mixture fan.
	*9 AB	9 ,, ,,	A	U	230—	1700—	125×170	5—5·4	—	583	—	—
	*18 AB	18 ,, ,,	A	U	500—	1700—	125×180	5·2	—	990	—	9 pair of cylinders. Not staggered.
S.F.F.A.	*B	3-Cyl. Radial	A	U	45—	—	105×125	4·75	—	165	—	—
	*A	7 ,, ,,	A	U	100—	—	105×125	5·4	—	297	—	—

ITALY.

Alfa Romeo	Lynx	7-Cyl. Radial	A	U	200—215	2000—2040	127×140	5·0	—	524	—	Also made with compressor.
												Do., compressor and reduction gear.
	D	9 ,, ,,	A	U	225—245	1900—2100	120×135	5·1	—	529	—	—
	Jupiter	9 ,, ,,	A	U	420—460	1700—1750	146×190	5·3	—	785	—	—
Fiat.	*A.50	7-Cyl. Radial	A	U	100—	1800—	100×120	—	—	286	—	—
	*A.20	12-cyl. 60° V.	W	U	430—	2060—	115×150	—	—	726	—	—
	*A.22 R	12 ,, ,,	W	U	560—	2100—	135×160	—	Geared	1165	—	—
	*A 22 T.	12 ,, ,,	W	U	570—	1900—	135×160	—	—	924	—	—
	*A 24	12 ,, ,,	W	U	700—	2000—	140×175	—	—	1056	—	—
	*A 24 R	12 ,, ,,	W	U	700—	2050—	140×175	—	Geared	1143	—	—
	*A 25	12 ,, ,,	W	U	950—	1900—	170×200	—	—	—	—	—
	*AS.3	12 ,, ,,	W	U	1000—	2500—	140×170	—	—	870	—	—
	*AS.5	12 ,, ,,	W	U	1000—	3200—	138×140	—	—	779	—	—
Isotta Fraschini.	*80 R	6-cyl. Line	A	U	100—126	2070—2440	100×140	5·4	0·677	312	Inertia	—
	Asso 200	6 ,, ,,	W	U	250—270	1700—1900	140×160	5·5	—	620	Compressed air	—
	*Asso Caccia	12 ,, V	A	U	450—495	2400—2520	125×140	5·7	—	825	Air Compressor	Air deflectors fitted in Vee of cylinder blocks.
	Asso 500	12 ,, V	W	U	500—543	1850—2000	140×150	5·5	—	960	Air compressor and inertia	—
	* ,, 500 R	12 ,, V	W	U	510—546	1975—2080	140×150	5·5	0·658	1080	Air compressor	—
	,, 500 R.A. 7	12 ,, V	W	U	590—642	1980—2190	140×150	7·0	0·658	1080	,,	—
	* ,, 750	18 ,, W	W	U	800—910	1700—1900	140×170	5·7	—	1430	,,	—
	,, 1000	18 ,, W	W	U	1000—1070	1600—1850	150×180	5·3	—	1738	,,	—

GERMANY.

Argus	4-Cyl. Inverted Line	A	U	80—	1400—	124×140	5·3	—	248	Hand turning	—
B.M.W. *Wasp	9-cyl. Radial	A	—	450—480	2100—	146×146	—	—	713	Inertia or hand turning	Pratt and Whitney licence
*Hornet	9 ,, ,,	A	—	525—575	1950—	158×171	—	—	827	—	,, ,,
*VII A.U.	12 ,, V	—	—	600—770	1530 air-screw	160×190	6·0	Geared	1230	—	Farman reduction gear.
Siemens. *SH. 13a	5-Cyl. Radial	A	U	75—88	1850—1900	105×120	—	—	242	—	—
*S.H. 20	9 ,, ,,	A	U	420—540 —600	1650—1800	154×188	5·3 6·3	—	891	—	Also made with Farman reduction gear.

CZECHOSLOVAKIA.

Walter. 60 N.Z.	5 Cyl. Radial	A	U	60—70	1400—1600	105×120	4·48	—	225	—	—
85 N.Z.	7 ,, ,,	A	U	85—90	1400—1500	105×120	4·48	—	280	—	—
*Vega 1	5 ,, ,,	A	U	85—90	1750—1800	105×120	5·15	—	227	Gas (Viet.)	—
*Venus 1	7 ,, ,,	A	U	110—115	1750—1800	105×120	5·15	—	291	,, ,,	—
130 N.Z.	9 ,, ,,	A	U	130—135	1600—1700	105×120	4·48	—	365		—
*Mars 1	9 ,, ,,	A	U	145—150	1750—1800	105×120	5·15	—	352	Gas (Viet.)	—
*Regulus	5 ,, ,,	A	U	185—230	1800—1900	135×160	5·2 or 5·7	—	420	—	—
*Castor	7 ,, ,,	A	U	240—350	1750—	135×170	6·0	—	550	—	—
*Atlas	9 ,, ,,	A	S	600—700	1900—1950	165×180	5·3	—	1056	Gas	Turbo compressor fitted

SPAIN.

Elizalde. *Dragon V	5-Cyl. Radial	A	U	165—180	1800—2000	130×140	6·0	—	375	—	—
* ,, VII	7 ,, ,,	A	U	320—350	1800—2000	150×150	5·25	—	660	—	Mixture fan.
*Superdragon	9 ,, ,,	A	U	525—570	1800—2000	150×190	5·5	—	840	—	,, ,,
								Geared	880		

* Engines at Show. S=Supercharged. U=Unsupercharged.

Private Flying & Club News

TAXYING MADE EASY.—The addition of wheel brakes is a very definite advance in the general equipment of aircraft and one which will have far-reaching effects on the popularisation of light aircraft in particular.

How often do we see people taxying circles when endeavouring to turn across wind. Then again, whenever space is constricted it is at present necessary to wait for a mechanic to hold a wing tip, in order to assist the turn. This state of things cannot have a beneficial effect on the sales of aircraft to those who are just coming into aviation and are, therefore, critical and who in so many cases can afford to pay for just whatever they want. They naturally say, "Why should I suffer discomfort in any form or put up with obvious makeshifts merely in order that I can save a few hours on a journey, as against the train?" and we cannot altogether blame them, can we?

Several of the aircraft available to the private purchaser are, however, now fitted with brakes and have their interior decoration and comfort quite on a par with the best motor-cars. One of the first open two-seater light aircraft to utilise them is the new Spartan Arrow, which by the way, is now made over at Cowes in the same factory as Saro machines, since the financial group controlling Spartan Aircraft has also acquired a large interest in the former firm, and Mr. J. Lord and Mr. H. Broadsmith have joined the Spartan board.

The Arrow has several features which make it an outstanding machine. First comes the inclusion of these Palmer wheel brakes in the specification. We were recently favoured with the opportunity of flying the Arrow, and found it extremely pleasant and simple. Although our trial was limited to a short flight, its advantages very soon made themselves evident. In taxying out or in, we were able to dispense with the attentions of anyone on the wing, even when we wished to manœuvre on an intricate course through the many machines on the ground. The brake pedals are situated just inside and above the rudder pedals, and operate on each wheel separately, so that when we wished to make a turn using one wheel as a pivot it was only necessary to put the inside brake hard on, and then just take the weight off the tail with the elevator and turn on the engine. It was found that in the air, the Arrow provided something very different from the usually accepted idea of a light aircraft. It seemed almost impossible to cause trouble by stalling her, and even with the stick right back, she only sank gently, and was still under lateral control. The ailerons seemed a trifle heavy at speed, but were perfectly effective at low speeds. The first impression gained was that it would be very difficult to get into trouble on such a machine, and that landings should generally be perfect, because she very nearly lands herself. The track of the undercarriage struck us as being somewhat narrow, for soft or rough ground, but its shock-absorbing qualities were excellent.

The view was as good as it ever can be in an aircraft of this design, and the cockpits were free from draught. The speed range seemed to be from about 105 to 35 m.p.h., which, in itself, is a remarkable achievement.

To sum up, the Arrow should be an excellent aircraft for the private owner, or for school work where a good climb, low landing speed, and freedom from vices are of prime importance.

There are many other points of interest in the Arrow, but these have already been more fully dealt with in a technical article in FLIGHT.

NEWCASTLE-UPON-TYNE AERO CLUB held their annual ball on January 16, and the club president, Sir Joseph Reed, and Lady Reed, were present. Miss W. Brown was at the same time presented with the *Evening World* Trophy, which she won for the fastest time from London to Newcastle during the last King's Cup race. The club's machines are at present being overhauled by the Brooklands School of Flying and by Cramlington Aircraft, Ltd., in preparation for the coming year. The following table shows the flying time for the past twelve months :—

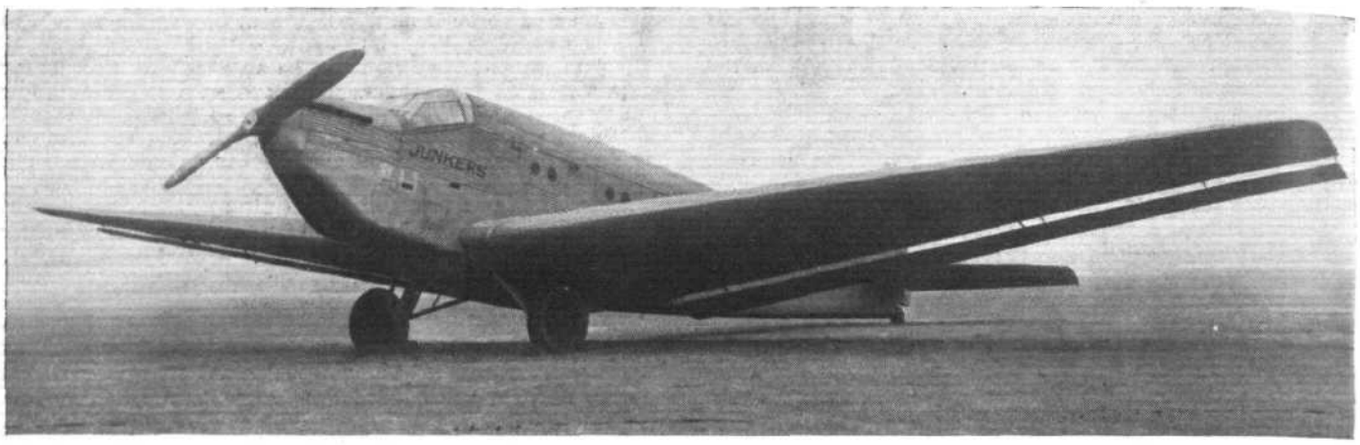
	Dual.		Solo.		Tests, etc.		Total.	
	h.	m.	h.	m.	h.	m.	h.	m.
January ..	24	50	41	45	7	10	73	45
February ..	25	00	45	55	4	50	75	45
March ..	29	10	54	30	13	20	97	00
April	33	15	47	20	13	50	94	25
May	71	55	87	05	11	10	170	10
June	65	35	141	35	32	15	239	25
July	77	05	94	25	31	55	203	25
August ..	68	35	33	15	19	35	121	25
September ..	50	05	56	55	11	50	118	50
October ..	37	45	43	55	21	35	103	15
November ..	20	50	22	45	6	00	49	35
December ..	13	25	20	30	11	10	45	05
	517	30	689	55	184	40	1,392	05

Aircraft, 3; Instructors, 1; "A" licences taken, 36.

A NEW AMERICAN LIGHT PLANE.—Light aircraft with engines under 50 h.p. are apparently gaining favour in America, for several have made their appearance recently. The accompanying picture shows one of the latest of this class—the Curtiss Wright "Junior," which possesses several distinctive features. The most important of these are its boat-like appearance, the pusher arrangement of the power plant, and that it sells at $1,490 (a little over £300). The main characteristics are as follows: Two-seater high-wing monoplane, 40-h.p. Szekeley SR-3, 3-cyl. air-cooled radial engine. Welded-steel fuselage; wood spar and rib-wing construction; fabric covering. Span, 39 ft. Length, o.a., 20 ft. 10 in. Height o.a., 6 ft. 4 in. Wing area, 175 sq. ft. Weight empty, 495 lb. Weight loaded, 900 lb. Wing loading, 5·1 lb./sq. ft. Power loading, 22·5 lb./h.p. Speed range, 28-80 m.p.h. Fuel capacity, 6·6 gal. Service ceiling, 12,500 ft.

The Curtiss-Wright "Junior" (40 h.p. Szekeley engine.)

Air Transport



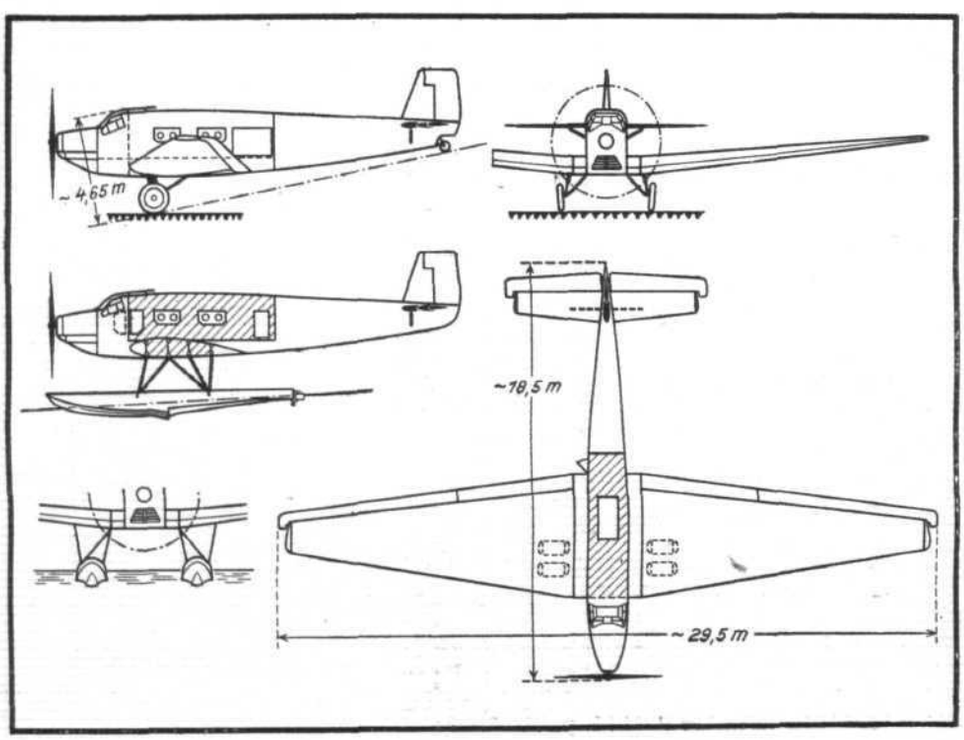
Three-quarter front view which shows the mounting of the wing flaps, giving a species of slot effect over them.

A FLYING LORRY

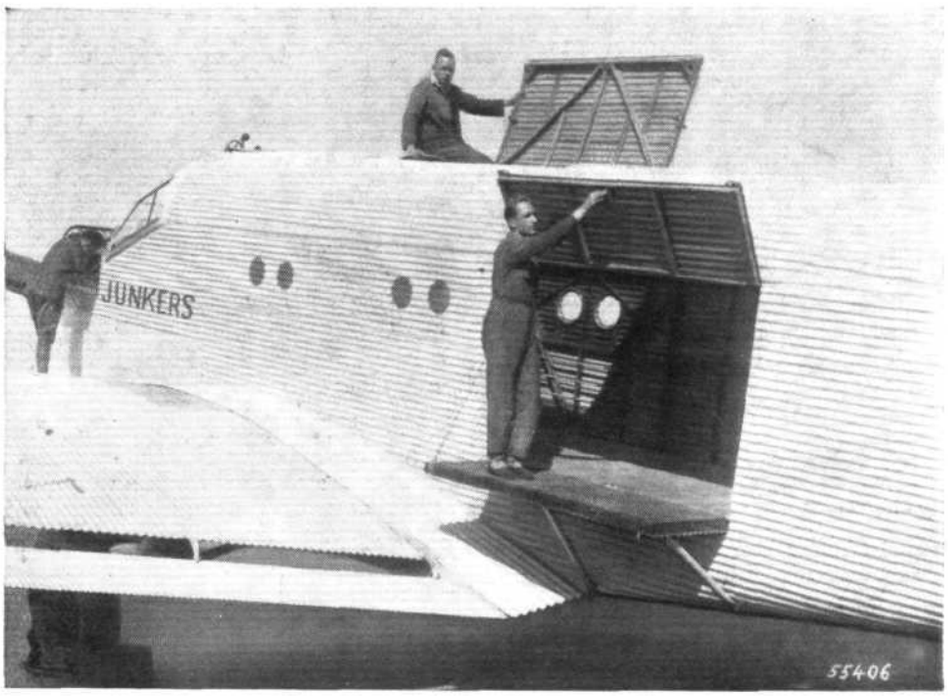
DURING a recent visit to the Junkers Aircraft Works at Dessau, we were privileged to see their latest freight carrier. The details of this machine are now available for publication, and it will be seen that it embodies several exceptionally interesting features. The Junkers Company have realised that there is money to be made in freight carrying, and have therefore designed this machine, the Ju. 52, as an improvement on the old W.33, or Bremen type. They consider it necessary for this type of machine (1) to have a larger and completely clear cargo space which is not interfered with in any way by the internal construction; (2) that this cargo space should be so arranged as to facilitate easy and quick loading and have provision for smaller spaces which can be locked up when carrying valuables; (3) the running costs should be low and the pay-load high; (4) the flying range and duration should be large. The W.33/34 has now been in use in all parts of the world for several years on many and varied kinds of work, and the experience gained with this machine has enabled them to produce the Ju. 52. A larger range and a higher maximum speed than the W.33 have been particularly sought after. The Ju. 52 is to some extent a breakaway from the present tendency for machines with high wing loading and fast-running air-cooled engines, and the engines for which she is designed are all of the slow-running geared type, while the majority are water-cooled. The following table gives a comparison between the main dimensions of the W.33 and the Ju. 52 :—

	W.33.	Ju. 52.
Span	58 *ft.*	95 *ft.*
Length	34·5 *ft.*	60 *ft.*
Wing area	473·5 *sq. ft.*	1,248 *sq. ft.*
Total cargo space	159 *cub. ft.*	777 *cub. ft.*
Floor area of cargo space ..	40 *sq. ft.*	113 *sq. ft.*
Disposable load	2,646 *lb.*	6,614 *lb.*
Engine horse-power	310	700

It will be seen that the engine power has been increased by about 2·3 times, the disposable load by 2·5 times, and the cargo space by 4·9 times. A particular advance is the increase in size of the clear cargo space. Doors are provided both in the side of the fuselage and in the top, so that the machine can be loaded direct from the ground or from lorries, and also by a crane, when there are very heavy articles to be carried. At the sides of the cargo space and under the floor are several small lockers, and the cabin itself is provided with round windows, so that there is plenty of light inside to facilitate loading.



The engine fitted to this first model is a B.M.W. VII of 685 h.p., but any engine, either water-cooled or air-cooled, of from 700 to 1,000 h.p. can be installed provided it is geared. The machine itself is of the usual Junkers all-metal construction, and has proved itself to have a very good take-off with a low landing speed. For this purpose the trailing edge of each wing has been arranged as three flaps, the inner two of which on either side can be lowered a small amount, in which case they have the effect of altering the camber of the wing and increasing the gliding angle, or they can be lowered still more to act as air brakes, while the outer flaps are normal ailerons. The wheels are fitted with brakes worked by air pressure, which facilitate taxying



View showing the side and top hatches for loading. The metal floor of the cabin is covered with 3-ply wood, and in the space between that and the bottom are the lockers for valuable goods.

and also, of course, greatly decrease the landing run. In place of the tail skid, the Ju. 52 is fitted with a pivoting tail wing. Behind the pilots' cabin is a partition provided for a wireless installation with operator, which might also be used for a postmaster if the machine is used to carry mails, and in the tail abaft the cargo space a lavatory can be fitted, if desired. The normal fuel capacity gives this machine a duration of 9½ hours, but it is quite easy to add additional tanks in the wings or in the floor of the cabin and to double this duration. With the B.M.W. VII engine the Ju. 52 has the following specification :—

Weight empty, including wireless, lighting, and instruments	8,819 *lb.*
Disposable load, including fuel and pay-load	6,614 *lb.*
Maximum speed	120·5 *m.p.h.*
Cruising speed	100 *m.p.h.*
Fuel consumption at cruising speed	253 *lb./hr.*
Landing speed at 15,433 *lb.*	48 *m.p.h.*

At cruising speed it is possible to carry the following loads for the following distances, non-stop :—

Distance. Miles.	*Pay-load. Lb.*
622	4,680
1,244	3,210
1,866	1,740
2,175	1,100

As an example of what this means, the following journeys may be quoted :—

Say :—	*Distance. Miles.*	*Pay-load. Lb.*	*Duration. Hrs.*
London–Berlin	560	4,785	5·5
London–Naples	956	3,749	9·5
London–Gibraltar	1,080	3,395	11·0
London–Baku	2,485	1,102	23·0

Or with intermediate landings of approximately 3 hr. at each place the following journeys are possible :—

Berlin–Rome (746 *miles*)–*Cairo* (1,304 *miles*) = *total* 2,050 *miles, with* 3,086 *lb., taking* 25 *hr.*

Berlin–Cairo (1,864 *miles*)–*Nairobi* (2,237 *miles*)–*Johannesburg* (1,864 *miles*)–*Cape Town* (870 *miles*) = *total* 6,835 *miles, with* 880 *lb., taking* 82 *hr.*

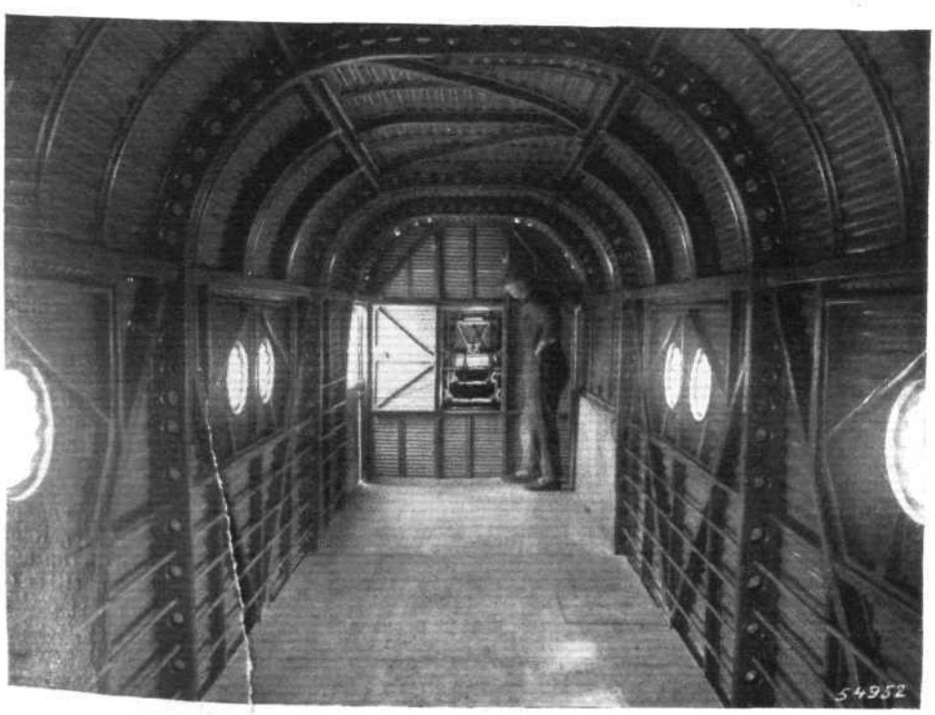
For long journeys such as these the second seat in the pilots' cockpit has been arranged so that by operating a lever it may be tilted back, and it then becomes a couch upon which the pilot off duty may sleep.

Although the present machine has been fitted with B.M.W. VII engine, the following may also be fitted, if desired : the Junkers L.88, supercharged 800 h.p. ; the Rolls-Royce H, 900 h.p. ; the B.M.W. IX, 750/800 h.p. ; the Armstrong-Siddeley Leopard, 850 h.p. ; the Renault or Farman, 800 h.p. ; and the Hispano, 1,000 h.p.—all of which are geared ; while the Asso, 750/800 h.p., and the Fiat, 1,000 h.p., may be used if gearing is fitted. At a later date it is intended to use the Junkers F.O.4 compression-ignition engine. It is interesting to note that this latter has now passed its first type test at 500 h.p., and will later be put through at 600 h.p., 700 h.p., and subsequently at 800 h.p.

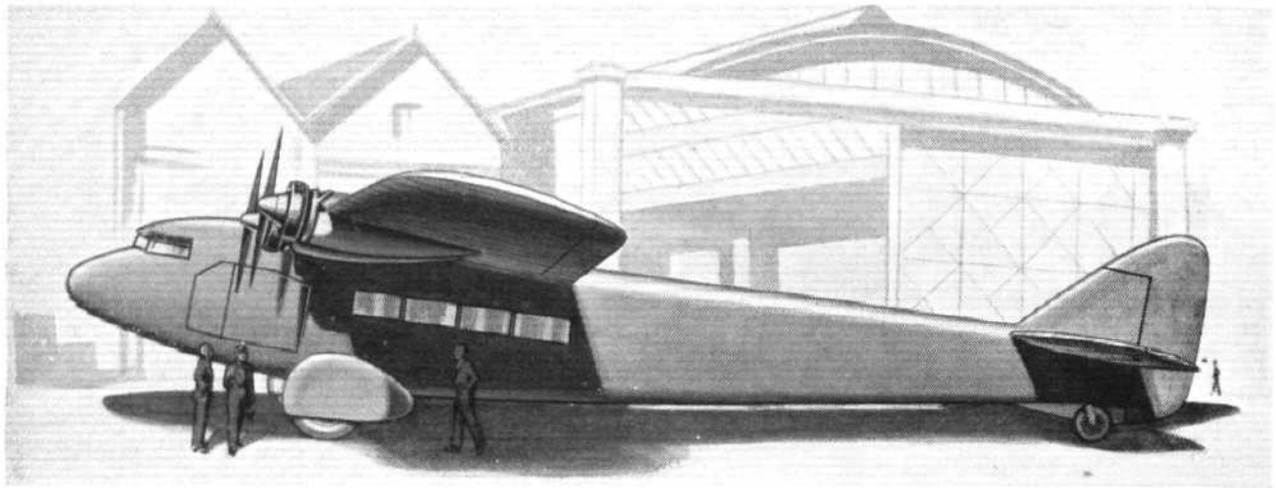
This exceptionally interesting engine has already been described in FLIGHT, and it will be seen that the power-weight ratio is low.

It runs very smoothly indeed, and the absence of vibration was very noticeable when we saw it on the test bed.

It starts with the same ease as its smaller version, which Junkers are fitting in lorries, and in a short trial of this latter type, we were amazed at the flexibility of the engine. It answers to the throttle immediately, and appeared to give full power at once after a start from dead cold.



An interior view of the cargo space.



FOR THE AFRICAN AIR ROUTE: The "A.W. XV" four-engined monoplane, which is being built for Imperial Airways by Armstrong-Whitworth, Ltd. It has four Armstrong-Siddeley "Double-Mongoose" engines.

THE ENGLAND—AFRICA AIR SERVICE

TOMORROW, February 28, the first section of the 8,000 miles Imperial Airways England–South Africa air route (full details of which were published in FLIGHT for October 17 last) will be inaugurated.

This new addition to the great system of Empire air routes planned by Imperial Airways is 2,670 miles in length, and extends from Cairo along the Nile to Khartoum, and thence, via the great Lakes of Africa, to Mwanza, in Tanganyika Territory. The opening of this new airway will provide air connection from Britain to the Sudan, North-East Belgian Congo, Uganda, Kenya and Tanganyika Territory, and, in addition, will bring India, Persia, and Iraq into direct air communication with the North-eastern half of Africa.

Beginning on February 28, the service will leave London each Saturday morning, reaching Khartoum on the following Friday and Mwanza the following Monday. The first flying-boat in the reverse direction will leave Mwanza at 7 a.m. on Tuesday, March 10, arriving at Khartoum at 5.45 p.m. on Thursday, and London the following Thursday morning. At Cairo connections will be made with Imperial Airways services, westbound for Europe and London and eastbound for Iraq, Persia, and India. It is expected that the service will be extended to Cape Town later in the year.

The service will be available for all classes of postal packets except parcels; packets may be registered but not insured. The Postmaster-General announces that the times of transit to the various countries served are expected to be as follows, the times taken by ordinary transport being given in brackets for comparison:—

Egypt, South, 5½ days (7–9 days); Sudan, North, 7 days (9–12 days); Sudan, South, 7½ days (15–12 days); North-East Belgian Congo, 10 days (25 days); Uganda, 8 days (19–31 days); Kenya, 9–10 days (17–30 days); Tanganyika, 10–12 days (20–32 days).

The air mail charges have been fixed at an inclusive rate per ½-oz., to include both air fee and ordinary postage. The rates for the various destinations served for the first ½-oz. and each additional ½-oz. respectively are as follows:—Egypt, 3½*d.*, 2½*d.*; Sudan, 5*d.*, 4*d.*; Belgian Congo (North-east, via Juba Sudan), 8*d.*, 6*d.*; Uganda, Kenya and Tanganyika, 7*d.*, 6*d.* The latest time of posting will be the same as for the Indian service, *i.e.*, in the Air Mail box at the General Post Office, London, at 6 a.m. on Saturdays and correspondingly earlier elsewhere.

In our previous article on the England-Africa air route we referred to the different machines it was proposed to employ over the various sections of the route, so we need not dwell at any length on this matter now, but it may be of nterest to supplement the information already given with ithe following.

We understand that Imperial Airways have ordered a fleet of entirely new machines, for service on this route, from Armstrong-Whitworth, Ltd. Some idea of these machines may be gathered from the accompanying illustration, and, as may be seen, the design possesses several interesting features—in general, departing from usual practice hitherto followed in this country as regards commercial machines.

This new machine is a four-engined high-wing-cantilever monoplane, fitted with four Armstrong-Siddeley "Double-Mongoose" engines—two on each wing—developing all told 1,360 h.p. It is claimed that the "A.W. XV"—as it is called—will have a maximum speed of 145 m.p.h., and a cruising speed of 115 m.p.h.—yet its landing speed will be only 60 m.p.h. With full load the machine will have a range of about 400 miles. At the moment we cannot give further details of the machine, but hope to do so on another occasion.

Finally, the first of the four-engined "Kent" flying boats which are being built for the African route by Short Bros. was launched at Rochester on February 24. Some illustrations of this first machine—the *Scipio*—will be found on page 175.

Air Mails to Belgian Congo

THE Postmaster-General announces that, according to information received from Belgium, the Belgian Congo Internal Air Service now offers acceleration to correspondence for Bandundu, Coquilhatville, Lulonga, Bangala, Aruwimi, and Stanleyville. It no longer gives advantage for letters to Leopoldville district, as the section Boma–Leopoldville has been closed. The combined postage and air fee for this service is 4*d.* for the first half-ounce and 2*d.* for each additional half-ounce.

France-African Air Services

M. DUMESNIL, the French Air Minister, has been authorised to introduce a Bill for the establishment of a company to organise air communications between France and her African colonies, including Madagascar.

Franco-Dutch Air Agreement

THE Royal Dutch Air Service has concluded with the French Air-Orient line, which is maintaining a regular service between France and Indo-China, a contract providing that each company may make use of the other's repair facilities and agencies.

Canadian Night Air Mail

A NIGHT flying air mail service has been organised in Canada, between Calgary and Winnipeg, with stops at Lethbridge, Medicine Hat, Moose Jaw, and Regina. It is said that the air ports can be seen at night at a distance of 80 miles.

Spanish-German Air Services

AN agreement has been signed by the Spanish Foreign Secretary and the German Ambassador in Madrid regarding an extension of the present air service between Berlin and Barcelona to Seville and Cadiz and Huelva. From either of these ports a seaplane service will maintain communication with the Canary Islands. It is proposed that the new services shall be carried out alternately by German and Spanish machines, but until the Spanish Government has made arrangements with a Spanish aviation company, only German machines will be flown.

Gliding

AUTO TOWING.—The demonstrations which have been given by Mr. Lowe-Wylde, in auto towing with his B.A.C. gliders, have created a considerable amount of interest, with the result that he has been asked to arrange an extended series of visits to different parts of the country, most of which are in conjunction with National Flying Services, Limited. The programme of demonstrations for the next few weeks will be as follows :—

On February 28 and March 1, for the Hull Aero Club, at Hedon Aerodrome, Hull.

On March 7 and 8 for the Newcastle-upon-Tyne Aero Club at Cramlington Aerodrome, Newcastle-upon-Tyne.

On March 14 and 15, for the Blackpool & Fylde Aero Club, at Stanley Park, Blackpool.

On March 21 and 22, for the Nottingham Flying Club, at Tollerton Aerodrome, Nottingham.

On March 28 and 29, for the Berks, Bucks, & Oxon Aero Club, at Reading Aerodrome, Woodley, Berks.

"GLIDING."—This is the comprehensive title of a book which will be produced early in March by the Dorset Gliding Club, and from the advance specification it would appear likely to be a most valuable addition to the books already available on the subject. It will include articles by all well-known people in the movement, as well as many pioneers whose names are bywords in aviation. For instance, Capt. G. T. R. Hill has written a section on tailless gliders, Col. the Master of Sempill has written a foreword, and other sections of particular value will be included from such authors as Mr. L. Howard Flanders, Mr. C. H. Latimer Needham and Herr Robert Kronfeld. When ready, "Gliding" will be available from FLIGHT office at 2*s*. 9*d*., post free.

SOUTHAMPTON GLIDING CLUB have now designed a quick-release gear which saves having three men on the tail, and this has been found extremely successful. They were unfortunate in having their first mishap on Sunday last, when the rear spar was broken close to the landing wire attachment, but club members were very soon able to repair this.

THE ASSOCIATION OF NORTHERN GLIDING CLUBS have had several successful week-ends recently, in spite of much rain and snow. Even in high winds they have found that their experienced pilots are able to make good use of their Dickson glider, and many landings have been made back on top of the hill, which makes pilots who do this very popular with the launching crews. The new "Rhön-Ranger," designed by Mr. Sutton, has been tested and found to be very successful. The clubs' experience is that their more advanced pilots prefer a day when the wind is at least 30 m.p.h. They do not allow anyone to take a machine up when the wind exceeds 15 m.p.h. until he is really expert, and they always instruct pilots to put the stick right forward directly the machine lands, as this tends to hold the nose of the glider down on the ground until help arrives and prevents the glider being blown over.

THE SOUTHDOWN SKYSAILING CLUB has moved its flying ground to High Barn, Rottingdean, and meetings will be held there every Sunday at 10.30 a.m. until further notice.

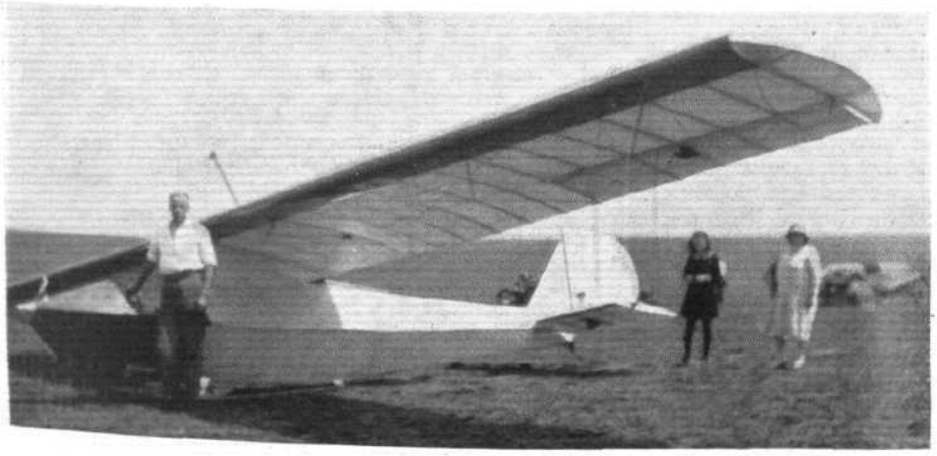
THE BRADFORD GLIDING CLUB have been doing good work on their Dickson glider until this was, unfortunately, crashed by a member on February 16. On the same day the "Airedale," a new training machine built by the Airedale Glider and Boat Manufacturers, of Saltaire, Bradford, was tried out, and it appeared to put up an exceptionally good performance. It is very quickly rigged and looks well, both in the air and on the ground. A full report of the machine will be made later.

BRITISH GLIDING ASSOCIATION.—The annual general meeting of the B.G.A. will be held in the library of the Royal Aeronautical Society, 7, Albemarle Street, W.1, on Friday, February 27, at 7.15 p.m.

THE SCUD.—The captions to our photographs illustrating the Scud last week, we are informed, rather gave the impression that this machine was built solely by Mr. Baynes. This, of course, was not the fact, since it was designed by Mr. Baynes and built by the Brant Aircraft Co., whose works are at Croydon.

THE LONDON GLIDING CLUB have, in spite of weather which was not particularly favourable, put in some very good work. On Saturday, February 21, two pilots, both trained *ab initio* by the club, qualified for their certificates. Mr. Graham Humby and Mr. Needham both made excellent prolonged soaring flights on the Prüfling, and the latter went for a distance of 1½ miles along the ridge until it looked possible that he might have to make a forced landing among a herd of bison at large in the enclosure of the country branch of the zoo at Whipsnade, and so turned and came back at high speed to his starting point. Another who made an excellent flight was Mr. M. L. McCulloch, who has recently qualified for his "C" licence," while several others made their first flights in the Prüfling. Conditions were not too favourable on Sunday, February 22, but some six members all made excellent prolonged glides.

GLIDING IN THE TRANSVAAL.—Mr. S. W. Vine sends us the following information of a glider which he has designed at Krugersdorp, Transvaal, South Africa. The country where he has carried out his experiments has an altitude of over 6,000 ft., and his experience should prove of interest. It will be seen from the illustration that the glider is a high-wing monoplane type, and the following are the rough details:—Span, 40 ft. 8 in.; length, 23 ft.; mean chord of main plane, 5 ft.; depth of main plane spar, 7 in.; area of elevator, 24 sq. ft.; rudder area, 11 sq. ft.; weight empty, 242 lb. The material used for the construction is chiefly American ash and the wing section is a modified Göttingen. Preliminary trials of the machine were carried out on a fairly flat veldt. The launching was carried out by means of 1,000 ft. of flexible steel cable, ¼-in. diameter, connected to a steel drum of 16-in. diameter revolving on the jacked-up rear axle of a Ford car (the differential being locked). The connection of the cable to the glider was by the usual hook and ring. This method was found to be quite successful and perfectly safe and economical, since it required only one person for a launching crew. Speeds up to 30 m.p.h. were easily obtained, and the ring could be released from the hook immediately by simply closing the throttle of the car. During the first flights it was found that a speed of 8–10 m.p.h. into a light wind of about 5-6 m.p.h. would lift the glider to a height of 35-40 ft., and this exceeded expectations, having regard to the speed, lift, and weight ratios and the altitude of the situation. Further trials were, unfortunately, cut short, since a native who was left in charge let go of the machine immediately he felt it move in the wind and it was blown across country. Mr. Vine has now completed a second machine of a more orthodox type and we hope to publish details of this later.



Mr. S. W. Vine and his sailplane.

Airisms from the Four Winds

The Princes Fly Again

ON February 21 the Prince of Wales and Prince George once again completed by way of the air a section of their South American tour, when they flew in a Ford air liner from Antofagasta to Santiago, taking just over seven and a-half hours for the 700-mile journey. On their arrival the Princes were welcomed by the Minister of Foreign Affairs, the British Ambassador, and the full *personnel* of the Embassy. At the Air Force officers' mess, Major Merino presented an address of welcome, to which the Prince of Wales replied in Spanish. The Princes later attended a reception at the British Embassy, and on the following day were present at a dinner given by President Ibanez. The Prince has conferred the order of C.B.E. upon Maj. Merino, Chilean Under-Secretary for Air. On February 23, the Princes and their suite left Santiago at 6.30 p.m. in a Sikorsky amphibian for Valparaiso, where they arrived soon after 7 p.m.

The Rangoon Flight to Basra

THE following is the itinerary of the three "Rangoon" boats of No. 203 (F.B.) Squadron, which are flying to Basra under the command of Group Captain Welsh. They left Mount Batten on February 14, and arrived the same day at Hourtin (Bordeaux). On the 15th they flew overland to Etang de Berre (Marseilles). On the 18th they left Berre for Naples, and at midday were signalled flying over Corsica. While *en route* they received a warning of bad weather at Naples, so they landed at Ostia. On the 23rd they went on to Naples.

The Cairo-Capetown Flight

THE three Victoria troop-carriers of No. 216 Bomber Squadron, which are carrying out the annual flight from Cairo to Capetown and back, left Capetown on the return journey on February 11 and arrived at Victoria West. On the 12th they flew on to Kimberley, on the 14th to Johannesburg, on the 17th to Pietersburg, on the 20th to Buluwayo, and on the 23rd to Broken Hill.

The Flight to the Cape

FLT.-LT. TOMMY ROSE, who is carrying out an aerial dash to the Cape in an Avro "Avian" on behalf of the Anglo-American Oil Co., arrived at Juba on February 16. He proceeded next day, and reached Bulawayo and Palapye Road on February 19. Unfortunately, when taking off from Palapye on February 20, the machine hit a lump hidden by grass, with the result that the undercarriage was damaged—"Tommy" was not, however, hurt. Anyway, bad weather at the start had prevented any chance of creating a record trip to the Cape—but better luck coming home!

And Another England-Australia Flight

FLYING a Spartan "Arrow" (Gipsy II engine), G. P. Fairbairn, an Australian airman, left Hanworth Aerodrome on February 19 in an attempt to beat Kingsford Smith's 10-day flight to Australia. He reached Nice on February 20.

A Portuguese African Flight

TWO Portuguese airmen, Carlos Eduardo Bleck (Secretary of the Aero Club of Portugal) and Humbuto Cruz, have just completed a flight from Lisbon to Loanda, Angola, and back, a distance of about 11,800 miles. They followed the West Coast to Bolama, then struck inland to Kayes and Bammako, striking the coast again at Grand Bassam, thence to Loanda via Lagos, Duala, Port Gentil and Point Noire. This flight was accomplished on a D.H. Moth ("Gipsy III") which gave no trouble whatever throughout the entire flight.

Those Soviet Airships

A REPORT from Riga states that the Soviet Government has resolved to build three dirigibles this year. The Council of People's Commissaries has sanctioned a five-year plan for dirigible construction with the view to establishing a Soviet Zeppelin service between Moscow, North Russia, Central Asia, and the Far East.

Aeroplane *v.* Rhinoceros

ACCORDING to the *Times* Nairobi correspondent, Herr Ernst Udet, the well-known German airman, figured in a curious adventure recently on the Serengetti Plains, where he was taking part in the making of a German film. Two aeroplanes set out over little-known country to photograph rhinoceros. One machine was forced down and turned turtle, dragging its two occupants 50 yards. Herr Udet, in the second machine, landed to give help; simultaneously a rhinoceros appeared and charged him. Before he was able to go to his companions he had to shoot the rhinoceros at 5 yards' range. The animal thereupon disappeared into the bush, enabling Herr Udet to transport his companions one at a time to the camp.

King's Cup Air Race

LORD WAKEFIELD OF HYTHE has presented £500 to the Royal Aero Club, to be devoted to Prizes for this year's King's Cup Air Race.

Forthcoming Air League Functions

ON April 7, there will be held at Hanworth Air Park an Easter Party and Children's Fête, beginning at 3.30 p.m. Tickets (including tea) at 5s. for adults and 2s. 6d. for children may be obtained from the Air League, Astor House, London, W.C.2., or from National Flying Services Limited, Hanworth, Nr. Feltham, Middlesex (Telephone: Feltham 264). The programme will include a flying display, flights for guests, gliding, model aircraft competitions, arrival of Dædalus from the air to distribute gifts to the children, lawn tennis, dancing, etc.

THE Annual Dinner of the Air League will be held on Wednesday, April 22, at Dorchester House, Park Lane. His Grace The Duke of Sutherland will preside. This will be the first public function after the opening to be held at the magnificent new hotel. Applications for tickets may now be made to the Air League, Astor House, Aldwych, W.C.2.

A New Aviation Company

AIR Service Training, Ltd., is the name of an aviation company which has just been formed, and in which the Armstrong-Siddeley Development Co., Ltd., is interested. The object of this concern, as its name implies, is the establishment of Flying Schools, where flying in all its branches will be taught. The directors include Air-Marshal Sir John Higgins, J. D. Siddeley, S. W. Hiscocks, F. P. Scott and Group-Capt. R. J. F. Barton. It is proposed to establish a school at Hamble and elsewhere.

Rustless Steels

ON February 3, Dr. W. H. Hatfield read before the Institution of Automobile Engineers a paper entitled "Rustless Steels as applied to Automobiles and Aircraft." The paper was of very considerable interest, especially in view of the increasing use being made of Firth's "Staybrite" steels in aircraft construction, and an abstract of the paper will be published in FLIGHT next week.

Hire and Fly Yourself

A NEW service has just been instituted whereby solo flying facilities will be provided for those who are not owner pilots but wish to fly without cumbersome restrictions. The Air Hire Co., of 50, Fairfield Crescent, Edgware, will now supply 1931 Gipsy Moths with balloon tyres and safety slots at an inclusive charge of £6 per day. This charge includes a full tank, and hirers will be allowed to fly in or out of England. A special week-end rate is also arranged at £12 12*s.* inclusive from Friday night to Monday morning. The Air Hire Co. have also opened showrooms at 18-22, Dering Street, New Bond Street, London, W., where anyone who is interested in learning to fly, hiring or purchasing an aeroplane, will be a welcome caller. A special invitation is extended to the many visitors now in London in connection with the British Empire Exhibition at Olympia.

Cirrus Achievements

CIRRUS AERO ENGINES, of Croydon, have received the following telegram from Bulawayo. "Britain to Bechuanaland in eight days. Hermes has behaved magnificently. Owing to contrary winds, she has been at full throttle two-thirds of the trip and is now better than ever. Every horse in her is fully thoroughbred."—Signed Tommy Rose.

They have also received a letter from the Brooklands School of Flying, Ltd., stating:—

"From March 1, 1930, to February 1, 1931, we have completed 1,125 hours flying on four School 'Moths.' These machines were fitted with Cirrus Mark II engines and, apart from minor adjustments, no trouble has been experienced. We should like to congratulate you on your service, and the general reliability of your products."

Finally, an official letter from Finland says that a Cirrus engine, fitted in a machine called "Ilmatar," has, up to the present time, completed 1,100 hours running. The Hermes engines in use by the Finnish Air Authorities are also giving satisfaction.

Airport News

CROYDON WEEKLY NOTES

THE week commenced with a very good prospect of a large amount of snow, which had it materialised to any great extent would have done much to disorganise traffic, as everyone knows, snow is as big, if not a worse enemy than fog, to aircraft. A number of the pilots have experienced very heavy storms and several machines arrived early in the week with a coating of frozen snow. However, taking the week as a whole, there were very few services interfered with, and the latter end of the week was brilliant.

Private owners were very plentiful, which is always a sign of good weather. Like the proverbial gnat, they can be seen in swarms in good weather. The arrival of the Hon. Mrs. Victor Bruce was the main attraction of the week. She left Le Havre on Thursday, and reached Lympne before lunch the same day. This was a very wise move, as it made the prospect of the official reception being held to schedule practically certain. Had she decided to fly from Le Havre to Croydon on the day of the reception, there may have been one of those unforeseen hitches which are apt to occur on special occasions. Happily all went well, and she arrived at Croydon at 11.57, on Friday. The reception was at midday so there was no delay at all, and everyone was thoroughly cheery.

The trusty " Bluebird " G-ABDS looks well weather beaten, and it is a feast for the eyes to take a look round it, there hardly seems a space left anywhere, it is one mass of signatures of people of all nationalities. Among some of the best known are President Doumergue, Jackie Coogan, and Al Capone, the notorious gangster. It would be nearly impossible to read them all. Captain Norman Blackburn, who was present, was attired in a magnificent camel hair coat. When someone asked him the reason for such grandeur, he explained that when wearing this coat, he could go without a drink for a week.

While the reception was in progress we had a visit from somewhere unknown. An autogiro hovered over the aerodrome for some considerable time, and seemed to be having a good view of all that was happening. The pilot did not land, however, so perhaps he was Scotch, and did not see any reason to land and have to pay for it, when he could sit comfortably up above and see everything for nothing. Autogiros ought to sell well in Scotland. What's wrong with watching your favourite football or rugger team from above ? There you are, my good Scotch friends, that's a good tip for you. An Autogiro at Croydon always attracts more than usual interest, as we seldom get a visit from one.

Mr. H. Frost's " Junker Junior " passed through here on its way to Amsterdam on Friday. We used to see quite a lot of this machine, but lately it has deserted us. The A.L.1 better known locally as the " Surrey ——d," and built by Surrey Flying Services, has been doing a lot of tests over the week-end. I cannot understand why this machine has never been developed. It was built at least 12 months ago, and has done very little flying. It appears to have an excellent performance, and was praised by the late Lieut.-Col. Henderson, a fact which alone speaks for itself. He was about the first pilot to fly it.

On Saturday, Lieut.-Cmdr. Glen Kidston, R.N., smashed all records for commercial aircraft flying between Croydon and Paris. He completed the trip in 80 minutes, on the Lockheed " Vega," with 4 up, and no gale to help him on. Had a gale been blowing in his favour, I can imagine the trip being completed in 60 minutes or even less. Until this new record was set up it was held by Imperial Airways. This time is going to take some beating. Have we one commercial machine in England in the same category, that can do it ?

Another American visitor on Saturday was a " Stearman " 3.C.B. sports biplane, fitted with a 220-h.p. " Wright " engine. It belongs to a Mr. R. Haliburton, and is piloted by a Mr. Moye Stephens. It is a very attractive looking craft, being painted in a scheme of red, black and gold, and named " The Flying Carpet." Like most of its fellow countrymen it is fitted with brakes and a tail wheel instead of a skid.

Private owners were dropping in and out all day on Saturday, and the aerodrome began to look really busy, giving just a foretaste of the coming season. A great deal of comment is being caused by the state of the aerodrome, which is really justifiable, but to be fair to the authorities, it is an honest endeavour to improve things, and as in all improvement schemes, a certain amount of inconvenience is bound to arise for a time.

All the Joyriding companies seem to have had a brisk week-end, and judging by the machines up and down there is room for them all, and anyway, competition is good.

Miss Maisie Proctor, who gained notoriety by flying to Berlin and back with Boyd and Connor, is now undergoing instruction for her " A " licence with Henderson Aviation Bureau.

There is quite an interesting article appearing in that weekly periodical " John Bull " for February 21, about Croydon. For once it is quite a reasonably sensible article, and can be read without the usual feeling of disgust that one has as a rule, when reading an article by someone who thinks he knows all about aviation, but in reality knows nothing.

The traffic figures for the week were: passengers, 301 ; freight, 28 tons. P. B.

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

AIRCRAFT S.O.S. SIGNALS

[2368] The " Emergency Communication between Aircraft and Ships " under the section " Air Ministry Notices to Airmen," in your issue of the 20th inst., is of particular interest to me, in view of the suggestion embodied in my letter in FLIGHT on January 2, dealing with the question of emergency communication between aircraft and the public. Though, of course, one can hardly describe any unit of the Fleet as the " public," it does bear out my theory that there should be generally recognised emergency signals, so that there should be no danger of aircraft in distress failing to have their condition appreciated.

With further reference to land aircraft in distress, perhaps the Air Ministry will go a step further and issue a similar order so that such aircraft will be able to fire recognised signals *i.e.* signals that will be easily recognised by air officials, pilots and lay public alike. Green Very lights, as advocated in the above Notice, would be equally practicable on land, and thus enable assistance to be quickly forthcoming. Also, it seems to me that there should be appended to the usual emergency lists in telephone booths and in places where public telephones are used, the name or names of the nearest aerodromes. This, I believe, is already the case where the telephone booths of certain road patrols are concerned. If necessary, the lay public could be " educated " into recognising and acting on these signals by means of the wireless, " talkie " films and the Press.

It may interest your readers to know that the emergency sound signal of the new Mobile Police Force was " taught " to the public via a " talkie." How much more useful then, will it be to use this medium (or any other) in teaching the public how to help in aircraft emergencies on land and at sea.

Our R.A.F. pilots protect us in time of war, cannot the public try and protect them and their non-Air Force colleagues in time of peace ?

MARY KNIGHTLEY

Golders Green, N.W.11.
February 22, 1931.

INTER-SERVICES RUGBY TOURNAMENT

Royal Navy *v.* Royal Air Force

THE Navy beat the Royal Air Force at Twickenham on Saturday, February 21, by two goals and two tries (16 points) to nil. The general result was not unexpected, for the Navy has shown itself to be the strongest Service team of the year, but the run of the play made the final score a little surprising.

The weather was kind. The sun shone genially, and the turf was in good condition. Walking down from the station to the ground, there seemed to be a very large number of spectators going to watch the match. The number seemed to shrink when they got inside, and to those who had seen the International match there on the previous Saturday, the stands seemed comparatively empty. But that is the way with Twickenham. The crowd, however, was full of enthusiasm, and each set of partisans kept up constant cheers for its own side. This all added to the holiday atmosphere of the afternoon.

As a game of Rugby, this match was not at all high class, but it was a very jolly game to watch, and it must have been a very jolly game to play in. Every one of the 30 men went sixteen annas to the rupee, and yet there was hardly a stoppage for injuries. The very best point about the game was the general excellence of the tackling on both sides—except on the occasion of the last try, when Wood went into the arms of more R.A.F. men than I could count, and came out again as if they were merely bumpers intended to mark the limits of his tacking movements. The second point which gave some class to the game was the fine full back play of Gosling for the Navy. Everything he did was of the highest merit. He caught with unfailing accuracy, his kicking was fine, and he was largely responsible for the first try by running up himself and setting his three-quarter line going.

In the first half of the game, the Navy three-quarters seemed a very moderate lot, apparently without the power and skill to overcome the very sound tackling of the R.A.F. outsides. St. Clair Ford, the Scottish international, was playing in the centre instead of on the wing. In the first part of the game he seemed to be feeling his way into this position, but towards the end he settled down in it, and by very strong running he did a good half of the work in gaining two of the tries which Wood scored. Wood had a very good day, crossing the line for three tries. He did not seem to move very fast, but he went for the line with great power and determination. He also had a drop at goal, which did not miss by very much. The Navy's half-back line was not very good as an organisation, but Hinde did many individual good things.

There was not a great deal to choose between the two packs of forwards. The Navy got the ball in the tight scrums more often than not, and at times their loose rushes were very effectual. But the R.A.F. forwards, finely led by Beamish, were a useful lot, who broke up quickly and tackled the Navy outsides with great gusto. Christie was often conspicuous in the loose. But most of the set scrums were irritating affairs to watch. Almost invariably they started swinging round and round before the ball went in, and, largely as a consequence of this rotating movement, the heeling was slow and gave the scrum halves very little chance of getting the ball away well to the fly halves. This, in turn, had a lot to do with the general ineffectiveness of the three-quarter movements on both sides.

Turning to the R.A.F. team, Ievers has often played better than he did last Saturday. He was cool, sometimes too cool, but he made two or three mistakes in fielding and in judgment. His worst fault, however, was the shortness of his touch-finding punts. He was so determined to be sure of finding touch, that he did not seem to try for length, and in consequence his side lost a lot of ground. That, however, is not to say that he was bad. His display was that of a good full back not on his day, and suffering by comparison with a very good one.

The R.A.F. three-quarters distinguished themselves by their defence, except on the one occasion mentioned above. This is a year of good tackling, such as is a joy to watch. Every man in this line went for his opposite number good and hard, and usually laid him flat on the turf. In attack they showed more pluck than skill. Each individual did some good things, and Coote was particularly conspicuous, but they did not work together as a machine. The passing lacked snap and accuracy. Too often a slow lobbed pass let the defence arrive at the same moment as the ball, and a good many passes were given much too high. Once in the second half it was deplorable to see no backing up when Coote broke well through the centre but found no one to take the ball when he was tackled. No; to be accurate, a Navy man took it and ran back. The best attack by the R.A.F. three-quarters ended in Robinson having no one to pass but Gosling. He made a good effort to side-step inside the full back, and the movement looked very hopeful, when unfortunately Robinson slipped. Hodder hardly got a decent chance. When he did get the ball there was often nothing to do but to put his head down and make an effort to bullock through. The Navy defence could not be treated that way with any hope of success.

At half back, Bader and MacLean worked very hard without much success. They were hampered by the slow heeling from the surging scrums. Early in the game, MacLean twice went round the blind side, and made considerable progress before he was brought down; but thereafter he was watched too closely.

In the loose, both sides showed too much desire to pick up, instead of dribbling. Over-keenness made man after man fumble the ball, with the result that there was much straggling and unscientific play. But in the latter half of the game the Navy forwards made some useful rushes.

The game had only been in progress for three minutes when a free kick was given to the Air Force. The attempt of the Navy to work back was stopped by a good tackle by Coote. Then Gosling was tackled in possession, and play went into the Navy 25. A free kick to the Navy brought relief. They got nearly to the R.A.F. 25 and there were given another free kick. This looked dangerous, but Forrest missed the goal. MacLean sold a dummy and got past the half-way line. The ball came along to Hodder, but he was well tackled about 15 yards from the goal line. Then a series of Navy rushes and a miss-kick by Ievers brought the Navy back. A couple of runs by Robinson took play up to the Navy goal line, and a period of Air Force pressure followed, which was not relieved by a free kick to the Navy.

After eight minutes of this, the Navy forwards brought off a rush, and the ball went along their three-quarter line to the left, where it ended in a bad pass to Wood. Hargrave kicked across the Air Force line to touch-in-goal, but the relief was only momentary. An Air Force kick which did not find touch was well caught by Gosling, who ran up and set his three-quarters in motion. Again, Hargrave kicked over the line, but this time Light followed up and touched down for the first try of the match. This was after 43 minutes' play. Gosling kicked the goal, and two minutes later the whistle blew for half time.

The sides crossed over with the score:

Navy, 5; Air Force, 0.

During the interval the Central Band of the R.A.F. marched round the field making sweet music. It is surprising how much a band can get through in five minutes.

The Navy played much better in the second half. Hinde made most of the running in a good movement which ended by giving Wood an easy score in the left-hand corner. Gosling missed the goal this time, so the Navy were 8 points to love.

Two free kicks to the Air Force did not help matters much. The Navy were getting the ball now in nearly all the scrums, but their passing was not good class. They gained ground by kicks and by forward rushes. Still one run looked dangerous, but the final pass to Wood was a bad one.

Robinson relieved the pressure with a very good run to past half way, and then Coote went through and found touch in the Navy 25. There a free kick was given to the Air Force, and Simmons had a creditable shot at goal. For a few minutes the Air Force kept up the pressure, but Navy kicking sent them back to their own 25. Then Ford got the ball and ran strongly down the centre and somewhat across to the left. Cutting out Hargrave, he gave a pass to Wood, who again slipped easily over in the left corner. This kick was also beyond Gosling's powers, so the score was now:

Navy, 11; Air Force, 0.

Though the Navy were now asserting superiority, a run up the right by Hodder took play back to the Navy 25. From a scrum the Navy passed out to their right. The ball went loose, and Ievers tried a fly-kick, but missed the ball. This had sad results for the Air Force. From half way, Ford started a run much like his last one, cutting in to the centre with great power, until he got within reach of Wood. When

he got his pass, Wood seemed not at all well placed, for there was no clear path to the goal. But he started to jink like a snipe. Man after man of the Air Force went for him and seemed about to bring off a successful tackle. But there was no force in the arms which pawed at Wood's waist and legs. He slipped through them and went on. It ought not to have happened, and it was an astonishing thing to watch, but it was certainly a brilliant piece of work by Wood. He ended up with a fourth try in a very good position, from which Gosling had no difficulty in placing a goal. This brought the Navy's score up to 16—0.

In the last few minutes, Bader broke through and took the ball up to the Navy's 25. A free kick to the Air Force did not find touch, and ground was lost as a result. The final incident of the game was another run by Ford, who was only bundled into touch just in time to save another score. Scotland might do worse than try Ford in the doubtful place at right centre against Ireland next Saturday. He is a very strong runner, and his defence is very much better than that of G. P. S. Macpherson. F. A. DE V. R.

The teams were :—

Royal Navy.—Lieut. C. G. Gosling (H.M.S. " Iron Duke ") *Captain*, full back ; Sub.-Lieut. H. J. F. Lane (H.M.S. " Excellent "), *Lieut. D. St. Clair-Ford (H.M.S. " Dolphin "), Sub.-Lieut. A. E. Hargrave (R.N.E. College), Lieut. W. H. Wood (H.M.S. " Erebus "), three-quarters ; Payr.-Lieut. C. B. Hinde (H.M.S. " Erebus "), Sub.-Lieut. G. Webster (R.N.E. College), half-backs ; Sub.-Lieut. N. L. Evans (R.N.E. College), Ldg.-Seaman W. Paddon, (H.M. " Vivid "), Marine C. Light (R.M. Depot, Plymouth), *Lieut. J. W. Forrest (H.M.S. " Excellent "), Marine C. Webb (H.M.S. " Erebus "), Lieut. C. M. Morrell (R.N.E. College), *E.R.A. E. H. Harding (H.M.S. " Beaufort "), Midshipman R. S. Hawkins (R.N.E. College), forwards.

Royal Air Force.—Flying Officer G. M. Ievers (No. 58 Squadron, Worthy Down), full back ; L.A.C. P. Robinson (No. 101 Squadron, Andover), Pilot Officer P. B. Coote (No. 43 Squadron, Tangmere), Pilot Officer I. McNicol (No. 58 Squadron, Worthy Down), Flight-Lieut. F. S. Hodder (Home Aircraft Depot, Henlow), three-quarters ; Pilot-Officer D. R. S. Bader (No. 23 Squadron, Kenley), Flying Officer D. L. MacLean (Home Aircraft Depot, Henlow), half-backs ; Sergeant A. C. Hall (C.F.S., Wittering), L.A.C. D. E. Gibbs (No. 5 F.T.S. " Sealand "), L.A.C. A. E. Simmons (Home Aircraft Depot, Henlow), Flying Officer H. A. Constantine (R.A.F. College, Cranwell), Flying Officer G. E. S. Williams (No. 58 Squadron, Worthy Down), Flight-Sergeant W. I. G. Kerby (R.A.F. Headquarters, Halton), *Flight-Lieut. G. R. Beamish (Home Aircraft Depot, Henlow), *Captain*. Corpl. M. G. Christie (No. 503 Squadron, Waddington), forwards.

* International.

THE ROYAL AIR FORCE

London Gazette, February 17, 1931

General Duties Branch

The follg. Pilot Officers on probation are confirmed in rank (Feb. 15) :—D. Carr, W. J. Scott. The follg. Pilot Officers are promoted to rank of Flying Officer :—C. A. Ball, N. J. Capper (Dec. 28, 1930) ; A. C. P. Westhorpe, A. E. S. Williams (Jan. 13) ; D. J. Douthwaite, G. K. Fairtlough, H. R. L. Hood, R. C. Keary (Jan. 27).

Flying Officer W. M. Rankin takes rank and precedence as if his appointment as Flying Officer bore date Jan. 7. *Reduction takes effect from Jan. 22.* Group Capt. T. G. Hetherington, C.B.E., is restored to full pay from half pay Feb. 18) ; Flight.-Lieut. F. R. Wynne, M.B.E., is placed on half-pay list, scale *B*, Feb. 17 to 25 inclusive. The follg. Squadron-Leaders are placed on retired list :—E. L. P. Morgan (Feb. 15) ; G. F. Breese, D.S.C. (Feb. 18). Pilot Officer R. C. Noble resigns his short service commn. (Jan. 30).

Medical Branch

E. Corner, M.R.C.S., L.R.C.P., is granted a short service commn. as Flying Officer for three years on the Active List, with effect from and with senv. of Jan. 28 ; Flying Officer J. Murphy, M.B., B.Ch., relinquishes his temp. commn. on completion of service (Feb. 3). The rank of Flight.-Lt. P. J. McNally, M.B., B.Ch., is as now described and not as stated in *Gazette*, Oct. 28, 1930.

Memorandum

13309 Flight Cadet S. C. Sharples is granted an hon. commn. as 2nd Lieut., with effect from date of his demobilisation.

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Flying Officer C. J. Pooley is transferred from Class A to Class C (Dec. 1, 1930) ; Flight Lt. H. G. P. Rees is transferred from Class B to Class C (Oct. 24, 1930) (substituted for *Gazette* Feb. 3) ; Flying Officer G. F. Mackay relinquishes his commn. on completion of service (Dec. 12, 1930) ; Flying Officer B. A. de Nevers relinquishes his commn. on completion of service and is permitted to retain his rank (Dec. 5, 1930) ; Pilot Officer on probation R. A. C. Barclay resigns his commn. on appointment to a Flight Cadetship at R.A.F. College, Cranwell (Jan. 15).

AUXILIARY AIR FORCE

General Duties Branch

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—Pilot Officer T. M. McNeil is promoted to rank of Flying Officer (Jan. 22).

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Senior Sister Miss M. W. Walker is promoted to rank of Acting Matron (Feb. 18) ; Matron Miss M. Welch, R.R.C., is placed on retired list at her own request (Feb. 18).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Wing Commanders : R. B. Maycock, O.B.E., to Special Duty List, whilst employed as Assistant Air Attaché, Buenos Aires, 7.2.31. J. S. T. Bradley, O.B.E., to Air Ministry (D.D.P.), for Personnel Staff duties, 7.2.31. K. C. Buss, O.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 1.2.31. J. C. P. Wood, to R.A.F. Base, Calshot, for Navigation duties in Training Section H.Q., 10.2.31. A. L. Gregory, M.B.E., M.C., to Marine Aircraft Experimental Estab., Felixstowe, pending posting to command No. 210 Sqdn., 10.2.31. G. H. P. Padley, to Sch. of Tech. Training (Men), Manston, for Engineer duties, 17.2.31. L. C. Keeble, to No. 10 Group H.Q., Lee-on-Solent, for Air Staff duties, 1.2.31. A. T. Whitelock, to Aircraft Depot, Karachi, India, pending taking over command, 14.2.31. R. Leckie D.S.O., D.S.C., D.F.C., to No. 210 Sqdn., to command, 13.4.31.

Stores Branch

Wing-Commander W. J. Shields, to R.A.F. Depot, Uxbridge, 10.1.31, on transfer to Home Estab.

Squadron-Leader F. Tedman, M.B.E., to Air Ministry (D. of E.), 16.2.31.

Flight-Lieutenants : W. St. J. Littlewood, to Air Ministry (D. of E.), 19.2.31. F. W. Todd, to H.Q. Fighting Area, Uxbridge, 2.2.31. M. J. James, M.B.E., to Aircraft Depot, Hinaidi, 10.2.31. G. W. Longstaff, to R.A.F. Depot, Uxbridge, 3.1.31.

Flying Officer G. S. Whellock, to No. 608 Sqdn., Thornaby, Yorks, 16.2.31.

Permanent Commissions for Short Service Officers.

THE names of the candidates who sat for the examination held in December, 1930, for specialisation with a view to being granted permanent commissions are shown in order of merit in the appendix to this order.

Twenty officers reached the qualifying standard, and vacancies will be allotted to them as indicated (" E " engineering, " S " signals, " A " armament).

The service on the active list of those who are due to transfer to the reserve before the results of the courses will become available, is hereby extended, pending their consideration for permanent commissions on the results of their training.

Flying officers.—Bufton, S. O., " E "; Ewing, W. G. H., " E " ; Stephenson, C., " S " ; Jordan, R. C., " E " ; Chapman, H. H., " S " ; Bowling, V. S., " E " ; Morris, R. J. P., " A " ; Britton, A. F., " E " ; Elliott, E. D. " E " ; Crisham, W. J., " S " ; McGregor, H. D., " E " ; Michie, W. D. J., " E " ; Jones, W. H., " E " ; Gilson, O. I., " E " ; Eady, T. W. G., " E " ; Farrow, B. G., " S " ; Tulloch, G. K., " E " ; Oothwaite, J. A. S., " E " ; Cameron, I. M., " E " Lock, J. H. ; Monro-Higgs, W. R. ; Howes, C. V. " E."

Foreign Officers at C.F.S.

THE following foreign officers have been attached to the Central Flying School, Wittering, for the course which commenced on February 3 :—Captain H. Kitwell, Estonian Air Service ; Sub-Lieutenant J. Stathis, Greek Air Service ; Petty Officer Spinoulas Greek Air Service.

R.A.F. Officer at Royal Naval Staff College.

THE undermentioned officer has completed satisfactorily the course at the Royal Naval Staff College, Greenwich, which ended in December, 1930, and he is entitled to the letters " *q.s.*" after his name in the Air Force List : Wing Commander A. C. Wright, A.F.C.

Aircraft Navigators' Licences (Civil).

IN order to assist R.A.F. officers and non-commissioned officers who are contemplating taking up civil flying posts when they leave the Royal Air Force, a scheme has been arranged whereby pupils who satisfactorily pass the Short Air Pilotage Course or the navigational subjects (including meteorology) of the Flying-Boat Pilots' Course will be exempted from taking the greater part of the examination for the 2nd class Aircraft Navigator's Licence. The scheme applies equally to pupils of past, present, and future courses. It should be clearly understood that no officer or airman can be accepted for such courses in order to assist him to obtain a civil aviation post.

THE ROYAL AIR FORCE MEMORIAL FUND

The usual meeting of the Grants Sub-Committee of the Fund was held at Iddesleigh House, on February 5. Mrs. L. M. K. Pratt-Barlow was in the chair, and the other members of the Committee present were :—Air Commodore B. C. H. Drew, C.M.G., Squadron Leader A. H. Wann. The Committee considered in all 16 cases, and made grants to the amount of £302 11*s.* 10*d.*

At the meeting held on February 19, Mr. W. S. Field was in the chair, and the other members of the Committee present were Mrs. L. M. K. Pratt-Barlow and Air Commodore B. C. M. Drew. The Committee considered in all nine cases, and made grants to the amount of £72 8*s.* 6*d.*

AIRCRAFT COMPANIES' STOCKS AND SHARES

SHARE markets have suffered from fears regarding possible new taxation in the coming Budget. Aircraft companies are not likely to be affected directly, but market prices of their shares have weakened in common with other industrial issues, probably only temporarily. Rolls-Royce and D. Napier have each been under the influence of uncertainty regarding results for the past year which, in both instances, are due to be announced shortly. The market is quite in the dark about Napier's probable dividend, as the rate will be on the enlarged capital. There may be sharp improvement in the event of the final dividend placing the shares on a 12½ or even 15 per cent. basis. Fairey Aviation debentures have marked at as high as 107, and the recession in the price of the ordinary has brought in buyers. Brokers are drawing the attention of their clients to the high earning capacity of the company in relation to the issued capital and the scope for capital appreciation in the shares. Handley Page preference have advanced on expectations of good accounts being issued with a repetition of the last annual dividend. National Flying Services ordinary have changed hands more frequently; permission has now been given for dealings to take place in the recently issued prior lien debenture stock, but no "markings" of business have yet been officially recorded. Petters shares were in quiet request at higher prices. Ford Motor fluctuated sharply on conflicting estimates of the dividend. In other directions Brown Brothers' shares advanced, and James Booth (1915) and En-Tout-Cas (Syston) were harder on balance on favourable estimates of the 1930 results, due to be announced shortly.

Name.	Class.	Nominal Amount of Share.	Last Annual Dividend.	Current Week's Quotation.
			%	
Anglo-American Oil	Deb.	Stk.	5½	100¼
Armstrong Siddeley Develop...	Cum. Pref.	£1	6½	16/3
Birmingham Aluminium Castg.	Ord.	£1	7½	20/3
Booth (James), 1915	Ord.	£1	15*	44/–
Do. do.	Cum. Pref.	£1	7	21/9
British Aluminium	Ord.	£1	10	29/3
Do. do.	Cum. Pref.	£1	6	20/3
British Celanese	Ord.	10/–	Nil	7/3
British Oxygen	Ord.	£1	10	20/–
Do. do.	Cum. Pref.	£1	A	21/7½
British Piston Ring	Ord.	£1	22½	28/9
British Thomson-Houston	Cum. Pref.	£1	7	24/6
Brown Brothers	Ord.	£1	10	24/6
Do. do.	Cum. Pref.	£1	7½	23/–
Dick (W. B.)	Cum. Pref.	£10	5	5 5/8
De Havilland Aircraft	Ord.	£1	5	15/9
Dunlop Rubber	Ord.	6/8	15	12/1½
Do. do.	"C" Cum. Pref.	16/–	10	21/–
En-Tout-Cas (Syston)	Def. Ord.	1/–	45	2/4½
Do. do	Ptd. Pfd. Ord.	5/–	12½	4/10½
Fairey Aviation	Ord.	10/–	7*	12/7½
Do. do.	1st. Mt. Deb.	Stk.	8	107
Firth (Thomas) & Sons	Cum. Pref.	£1	6	11/6
Do. do.	Cum. Pref.	£1	5*	12/3
Ford Motor (England)	Ord.	£1	10	71/10½
Fox (Samuel)	Mt. Ptual. Deb.	Stk.	5	72½
Goodyear Tyre & Rubber	Deb.	Stk.	6½	99
Handley Page	Ptg. Pref.	8/–	12½	10/3
Hoffmann Manufacturing	Ord.	£1	10*	22/4½
Do. do.	Cum. Pref.	£1	7½	17/3
Imperial Airways	Ord.	£1	7½	17/3
Kayser, Ellison	Ord.	£5	6	60/–
Do. do.	Cum. Pref.	£5	6	77/6
Lucas (Joseph)	Ord.	£1	25	66/–
Napier (D.), & Son	Ord.	5/–	60B	6/9
Do. do.	Cum. Pref.	£1	7½	22/9
Do. do.	Pref.	£1	8	20/–
National Flying Services	Ord.	2/–	Nil	/6
Petters	Ord.	£1	7	21/10½
Do.	Ord.	£1	7½	19/–
Roe (A. V.) (Cont. by Armstrong Siddeley Devel., *q.v.*)	Ord.	£1	—	—
Rolls-Royce	Ord.	£1	10	34/6
Smith (S.) & Sons (M.A.)	Def. Ord.	1/–	18¾	1/10½
Do. do.	Ptg. Pfd. Ord.	£1	12½	22/–
Do. do.	Cum. Pref.	£1	7½	17/3
Serck Radiators	Ord.	£1	17½	37/6
"Shell" Transport & Trading	Ord.	£1	25*	71/10½
Do. do.	Cum. Pref.	£10	5	10½
Triplex Safety Glass	Ord.	£1	5	33/6
Vickers	Ord.	6/8	8	6/6
Do.	Cum. Pref.	£1	5*	17/9
Vickers Aviation (Cont. by Vickers, *q.v.*)	—	—	—	—
Westland Aircraft (Branch of Petters, *q.v.*)	—	—	—	—
Whitehall Electric Investmts.	Cum. Pref.	£1	7½	25/4½

A Issued in January. B Plus 300 per cent. share bonus.

* Dividend paid tax free.

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THE well-known firm of steel workers, Samuel Fox & Co., Ltd., of Stocksbridge, Sheffield, have produced a steel, suitable for automobile and general engineering purposes, similar to nickel steel, but more easily machined. "Tormanc" as it is called, is one of the Fox "Stocksbridge" alloy steels, which has been specially developed to fill the gap between ordinary carbon steels and the nickel steels. It will be found to be suitable for all purposes where something better than an ordinary carbon steel is required, *i.e.*, where a tensile test of 40/55 tons is wanted, with good ductility. "Tormanc" also forges well, and is particularly suitable for the manufacture of high-tensile nuts and bolts.

Densleys, of Birmingham

MR. H. CLAYTON WRIGHT—who recently resigned from Desmo, Ltd.—informs us that his present company, Densleys, of Birmingham, as well as producing certain lines in connection with motor components similar to his late company, have secured the sole automobile selling rights of Laycock Engineering Co. productions, while they have also secured sole selling rights for the motor and aero sections of Crane Packing, Slough.

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PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda. No. 1305 (*E.* 41). A Harmonic Analysis of the Torque Curves of a Single Cylinder Electric Ignition Engine when Throttled to Various Mean Indicated Pressures. By N. S. Muir and A. Terry. March, 1930. Price 1*s.* net. *No.* 1334 (*Ae.* 467). Wind Tunnel Experiments with Circular Discs. By L. F. G. Simmons and N. S. Dewey. Feb., 1930. Price 9*d.* net. H.M. Stationery Office, London, W.C.2.

Heidelberger Studien. Vol. 1, *No.* 1. *Zur Rationalisierung der innerdeutschen.* By Dr. E. Osswald. Weiss'schen Universitätsbuchhandlung, Heidelberg.

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AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

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